CLIMATE CHANGE

Weather, Climate and the Future: B.C.'s Plan

British Columbia's plan to address climate change is the result of extensive research and consultation with, among others, scientists, health officials, economists and everyday British Columbians.

The Plan's 40 actions to reduce greenhouse gas emissions are listed below in five categories.

Progress has already been made on the majority of these actions.

Sustainable Energy Production and Efficient Use

Efficient Infrastructure: Transportation, Buildings and Communities

Sustainable Forest and Carbon Sink Management

Government Leadership and Outreach

Water Management

Sustainable Energy Production and Efficient Use

1. **The government will continue to implement the B.C. Energy Plan, which promotes alternative energy and investment in conservation and energy efficiency through a 50 per cent clean-energy goal for new electricity demand, new rate structures and regulatory changes.**
The 50 per cent clean energy goal is the first of its kind in Canada and will contribute to slowing per capita greenhouse gas emissions in B.C.

The province has facilitated the largest purchase of green energy in B.C.'s history, resulting in 16 power projects, including hydro, landfill gas and wind energy.

2. **An industry advisory group is helping to prepare a strategy to ensure that B.C. remains a leader in the development of hydrogen and fuel cell technology.**
Global demand for fuel cells and related products is expanding rapidly, and B.C. has the expertise and resources to continue to lead in this clean energy sector. B.C. has the world's largest cluster of hydrogen and fuel cell companies, with 25 firms employing over 1,200 people.

The province has invested $4.4 million in clean energy and fuel cell research in the past two years, promoting the development of clean energy sources. In addition, the provincial and federal governments committed a total of $13 million for the fuel cell industry in B.C.

3. The government will enhance energy conservation and alternative energy with a comprehensive energy strategy and facilitation of technology road map's for hydrogen and bioenergy.
Government will specify provincial goals for reducing energy demand and alternative energy production, including the development of bioenergy from softwood and other organic wastes.

B.C. is already reducing by over one million tonnes greenhouse gas emissions annually because of BC Hydro's Power Smart program.

4. The government will work with large industrial emitters to ensure that federal greenhouse gas reduction targets are fair and to identify barriers and solutions to emission reduction measures.
Government will work with industry to identify and remove policy, technological, and other barriers to reducing greenhouse gas emissions from this sector.

B.C. has clearly called for the federal government to credit the province's clean energy production and the early action that has already occurred in various industrial sectors to reduce emissions.

5. The government will work with trade and industry associations to promote greenhouse gas measures in smaller businesses, including ecoefficiency measures in smaller manufacturing plants.
Government will work with trade and industry associations, utilities and other partners to provide information on energy efficiency opportunities for small businesses.

BC Hydro's Product Incentive Program for businesses has been specifically designed to help organizations reduce their energy costs and save money by providing incentives to encourage simple product replacement with more efficient technology.

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Efficient Infrastructure: Transportation, Buildings and Communities

6. Climate change will be incorporated into B.C.'s transportation planning and investment strategies.

The government has committed over $365 million for the construction of a rapid transit line from Richmond to Vancouver and over $150 million for the extension of a rapid transit line to the northeast sector of the GVRD.

It also supports initiatives for use of alternative fuels and alternative fuel vehicles.

7. A provincial transportation demand management initiative will also address greenhouse gas reduction.
Government will work with partners to enhance public transit, reduce congestion, and identify other ways to move people more efficiently.

The government has committed $2 million to cycling infrastructure across the province, encouraging a clean form of transportation.

8. As part of a Canada-B.C. partnership, the government is investing in international border

crossings and other infrastructure to reduce congestion in the Lower Mainland.
More than $200 million will be invested for eight highway accesses leading to border crossings facilitating safe and efficient movement of goods and people, and reducing greenhouse gas and other airborne pollutants.

9. **The government will consider further incentives to encourage the purchase of alternative fuels and hybrid vehicles.**
Drivers who switch to alternative fuels or hybrid vehicles are helping to reduce greenhouse gas emissions.

Provincial fuel tax has been removed from biofuel blends and a PST exemption of up to $5,000 has been applied to clean-running midsized buses.

10. **Driver information explaining how to reduce emissions will be improved.**

Government will provide drivers in B.C. with information about reducing emissions through good driving habits and vehicle maintenance.

This information will be added Ministry of Transportation and ICBC driver training materials.

11. **Work is underway to adapt building standards based on LEEDTM (Leadership in Energy and Environmental Design) to the circumstances that apply in B.C.**
LEEDTM helps architects and builders design and construct buildings that meet high energy efficiency and other high environmental standards.

As of December 2003, 31 of 54 Canadian LEEDTM projects were registered in B.C.

12. **The government is updating minimum energy efficiency standards for equipment, and is conducting a review of energy performance in buildings.**
Government will work with the construction sector and others to improve energy use in new and existing commercial and residential buildings, as well as standards for appliances, heating and cooling equipment, lighting and other energy-using devices.

A unique federal-provincial pilot project promoting energy efficiency in communities is underway in Kelowna, under the jointly sponsored Community Action on Energy Efficiency program.

13. **The provincial government will encourage local government action and will expand local government infrastructure planning grants.**
Government will encourage and assist municipal governments in setting emission reduction targets and incorporating greenhouse gas reduction into planning and operations.

B.C. supported the development of a Greenhouse Gas Action Guide to assist municipalities in implementing immediate cost-effective actions to reduce emissions.

14. **A remote communities' clean energy initiative is underway to explore alternatives to diesel generators and fuel oil use in remote communities.**
Government is working with remote communities to provide the information and resources communities need to reduce their greenhouse gas emissions while improving their local economies.

15. **The government will partner in selected leading edge high performance commercial buildings.**
Government is a partner in a proposal to develop an energy efficient building that would be a laboratory for the next generation of green building technologies.

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Sustainable Forest and Carbon Sink Management

16. The government will continue to manage its forests in a sustainable manner, incorporating carbon management objectives where appropriate.
Government manages public forests for a full range of values and will consider carbon management in the context of other forest management goals.

Approximately 70 percent of BC's annual harvest now comes from operations that are either third-party certified or meet International Standards Organization's requirements.

17. Government will continue to assert ownership of any forest sink and associated benefits, and call for recognition of the cost of maintaining that sink.
Government is working to ensure that any credits for the storage of carbon in provincial forests belong to the people of B.C. who pay for the management and protection of these forests.

18. The government will develop a policy framework to provide business certainty and support the creation of incremental forestry sinks.
Government will work to remove structural barriers to and encourage investment in initiatives that increase carbon storage in provincial forests.

19. The government will continue to improve understanding and protection of the forest carbon sink by supporting modeling and ongoing research, and will continue to protect this sink.
An important area for enhanced modeling is the disturbance caused by the mountain pine beetle. The government will also continue to participate in research aimed at improved understanding and protection of the provincial forest sink, such as support for the BIOCAP Canadian Foundation.

20. The provincial government will enter into discussion with the Government of Canada on forest management mitigation strategies for mountain pine beetle.
Government will work towards a federal/provincial agreement that addresses sustainability and carbon management objectives within the context of the mountain pine beetle outbreak.

21. The government will improve fire protection for communities in British Columbia.
Climate change will likely increase the frequency and severity of droughts and heat waves, and the length of the fire season, and communities must be prepared.

Government developed a Hazard, Risk and Vulnerability Analysis Took Kit and provided $3 million to the Union of B.C. Municipalities to help local governments prepare for fire and other emergencies.

In 2004, it distributed thousands of FireSmart manuals to assist homeowners in making their home and property less susceptible to wildfire.

Accepted all 42 recommendations included in the Filmon Report into the 2003 wildfire season. Among these was a multimillion investment in additional firefighting crews and equipment.

22. The government will limit the economic and social costs of the mountain pine beetle outbreak.
Communities in British Columbia are vulnerable to climate change, extreme weather, and related impacts. Government can help communities prepare for and respond to these impacts, thus helping to minimize negative impacts.

Government has responded to the mountain pine beetle outbreak by aggressively working on detection and removal of trees on the leading edge of the infestation.

It has also struck a Bark Beetle Task Force to develop new uses and new markets for recovered wood, and to promote diversification of forest-based communities among various other initiatives.

23. Under a B.C.-Canada agreement, provincial emissions from agriculture will be reduced by 8 per cent by 2008.
British Columbia will meet this greenhouse gas reduction target through a range of management activities under the Agricultural Policy Framework's environmental farm planning component.

24. The government will provide support to the B.C. Agriculture Council to implement best management practices on B.C. farms and ranches.
Best management practices will help to reduce greenhouse gas emissions from the provincial agriculture sector. The Province received a $20 million contribution from the federal government under the B.C.-Canada Agricultural Policy Framework agreement.

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Government Leadership and Outreach

25. The B.C. Buildings Corporation (BCBC) is conducting energy audits and retrofits of provincial buildings under a renewed energy management initiative.
The renewal program is designed to improve performance, reduce operating costs, and improve energy efficiency of government buildings, and to reduce greenhouse gas emissions.

BCBC has begun work towards its target of a 12 percent reduction in the energy intensity of provincial buildings from 2000 to 2007 through self-financing retrofit projects.

26. A new Higher Performance Building Policy will be applied to all new provincially funded buildings.
Government will set performance targets for all new construction and major renovation of buildings used to deliver provincial services, and help build support for the local green building industry.

Green Buildings B.C., a provincial initiative with BCBC, has been effectively promoting dramatic increases in the performance of new and existing buildings managed by B.C.'s education and health care agencies.

27. The government will develop guidelines and performance targets for ministries and Crown agencies to acquire cleaner vehicles, fuels and transportation services.
Government agencies will identify targets for energy efficiency in vehicle fleets and goods and services, and work towards meeting these targets.

Government currently has 64 hybrid electric cars in its fleet, the largest such fleet in Canada. It has also instructed ministries to first consider hybrid vehicles when replacing older gas and diesel models.

28. The government will encourage ministries and Crown corporations to incorporate emission reducing policies and guidelines in their service plans.
Annual service plans lay out the expectation of provincial agencies for delivering their programs over a three-year period.

The Ministries of Water, Land and Air Protection and Agriculture, Fish and Food recognize climate change as a risk factor in their annual service plans.

29. The government will address climate change and extreme weather in planning and operations.

Government agencies recognize climate change as a risk factor, and are considering methods for addressing climate-related risks in operational and policy decisions.

Government has enacted both a Fire Management Plan and a Drought Management Plan to deal with just two extreme weather-related issues.

30. The government will implement effective monitoring and reporting procedures for climate change and its impacts in cooperation with partners.
British Columbians need reliable climate observations to detect regional changes in climate, project future regional impacts, and prepare for these impacts. Government will work with partners to strengthen monitoring networks, make data more widely available, and report on climate trends.

B.C.'s weather and river flow monitoring networks have been reviewed to determine how effectively they will meet future information needs to manage natural resources, protect public safety and design infrastructure.

31. The government will help develop climate models and other tools for assessing climate change risks and adaptation options.
Government is working with partners to develop tools — including regional climate models and decision-making frameworks — to help British Columbians identify how climate change may affect them and prepare for future impacts.

The Ministry of Water, Land and Air Protection, in partnership with Ouranos Inc., a climate science consortium, is developing high resolution regional models of climate conditions to improve understanding of how global climate change processes may affect B.C.

32. The government will support applied climate change research that meets the needs of decision makers.
Government will work with industry, business, municipal government, and other provincial stakeholders to identify key provincial information needs, and will support research that addresses these needs.

B.C. has supported research on climate change and surface water supplies in the Okanagan, and on climate change and biodiversity.

33. The government will participate in the development of capacity throughout B.C. to respond to extreme weather and climate change.
Government will work with partners to develop capacity within the province to identify and prepare for climate-related risks, by ensuring that local expertise to apply emerging tools and information is developed and sustained.

Government has invested millions of dollars in drought planning, wildfire management and into fighting the mountain pine beetle infestation.

34. The government will prepare and deliver an outreach strategy that supports adaptation and greenhouse gas reduction initiatives in the Plan.
Government will support outreach through partnerships like that with the Fraser Basin Council and the B.C. Climate Exchange. Government will enhance its own climate change website, and work with provincial partners to develop and deliver information about greenhouse gas reduction.

Government has invested over $100,000 in support of the BC Climate Exchange and the Greenhouse Guide Action Guide. These outreach programs provide communities and individuals with information on addressing greenhouse gas emissions.

B.C. has documented historic climate change in its 2002 report Indicators of Climate Change for British Columbia, and supports regional and sectoral workshops on climate change.

35. **Joint initiatives will be pursued with other jurisdictions where these initiatives support government objectives.**
The Government of British Columbia is working with the governments of Canada, Alberta, other provinces, and the western states on issues of mutual interest and benefit.

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Water Management

36. **Government is implementing the Drought Action Plan.**
Government has established a drought planning fund, prepared a Drought Handbook, offered water planning workshops, and established a public awareness program to help communities with stressed water supplies.

About $900,000 from the $2 million drought planning fund has been committed to 75 local water suppliers.

37. **Information and support is being provided to communities facing flood risks.**
Government provides communities at risk with technical guidance and training in floodplain development, flood preparedness and related matters.

During 2004, eleven workshops were held around the province to train local flood observers, and a survey of all 300 dikes in B.C was completed. Survey information will be available online soon and will help local authorities and the Inspector of Dikes ensure public safety.

38. **The government is supporting climate science and the development of technical tools relating to water resources management.**
Climate affects the volume and timing of river flows, lake levels, groundwater, and flood and drought frequency, and climate change presents challenges to water managers across the province.

Government has supported the development of stormwater management models, establishment of weather monitoring stations on agricultural lands, and research on groundwater supply in the Okanagan.

39. **Government will support integrated watershed management to address water resource issues including drought and flooding.**
Integrated watershed management ensures secure, sustainable, and clean water for all users, and can help resolve conflicts during periods of water shortage, identify long term flood management solutions, and address water management issues related to climate change.

40. **The province will work with partners to develop a coastal flood forecasting capability.**
Climate change may increase the frequency and severity of coastal storms, and provincial and federal agencies are working together to increase capacity to forecast extreme high water events and examine coastal dyke and flood protection standards.

B.C. is supporting scientists at the Institute of Ocean Sciences in Sidney in the development of a storm surge forecasting model.

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Weather, Climate and The Future

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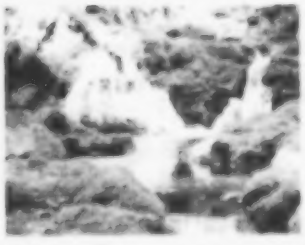

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B.C.'s PLAN

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Preface

In the past decade, the issue of climate change and greenhouse gas emissions has become increasingly important to British Columbians. Over the last century, average temperatures have changed globally. Warmer temperatures in British Columbia have supported the rapid spread of the mountain pine beetle. British Columbians are also concerned about recent extreme weather events and effects, including forest fires, droughts and floods.

Climate change is a global challenge. And although the nations of the world are front and centre in the effort to address climate change, all jurisdictions have a role to play, including British Columbia.

British Columbia, like all provinces in Canada, is unique. And this unique position must guide the province's contribution to the fight against climate change.

British Columbia has the third lowest greenhouse gas emissions per capita in Canada. Contributing to this leadership position are the significant investments the province has made in clean energy, transportation, communities and forest management.

At the same time, British Columbia is built upon the strength of its resource industries - forestry, mining, energy, and agriculture. It is these resource industries that will in large part decide the economic growth and success of British Columbia in the 21st century.

British Columbia's efforts to address climate change must respond to the province's strengths as well as its inherent challenges.

Action on climate change will involve the reduction of greenhouse gas emissions as well as preparation for future climate change and related extreme weather. Since climate and other natural systems often respond with long lags to changes in emissions we must ensure that we are properly prepared.

As British Columbians establish and implement plans at the provincial, local and household level to address climate change issues, those plans must recognize the need to protect and retain our competitive position in the North American market place, the primary market for our goods and natural resources.

British Columbia has developed a climate change action plan that incorporates these objectives. The plan responds to and protects the interests of British Columbia; it builds upon the significant investments already made in clean energy, infrastructure and forestry and is complemented by actions already underway to adapt to the challenges presented by the mountain pine beetle, forest fires and drought.

Executive Summary

British Columbia currently has the third lowest greenhouse gas emissions per capita in Canada. This leadership position comes largely as a result of early and prudent investments in clean, renewable energy.

Weather, Climate and the Future: B.C.'s Plan (the Plan) makes it clear that the Government of British Columbia aims to retain or improve upon the province's current emissions ranking.

The Plan is built on a list of 40 actions complemented by specific emissions-related targets for agriculture, buildings, government operations and other sectors.

Many of these actions are supported by significant steps and investments already taken in B.C. that will result in a reduction of greenhouse gas emissions:

- B.C.'s Energy Plan calls for 50% of all new electricity to be BC Clean. Sixteen independent power project agreements have been signed to produce energy from hydro, landfill gas and wind energy.
- BC Hydro is a world leader in encouraging energy conservation and efficiency through its Power Smart program.
- B.C. is a leader in hydrogen and fuel cell technology; B.C. has the world's largest cluster of hydrogen and fuel cell companies with 25 firms employing over 1,200 people.
- In an effort to promote alternative forms of transportation, the government has committed $365 million for the construction of a rapid transit line from Richmond to Vancouver.
- In order to facilitate more efficient movement of goods and people, reducing greeenhouse gases and other airborne pollutants, British Columbia, in partnership with the federal government, is investing more than $240 million in a five-year program to improve eight highways that lead to border crossings.
- In order to build and maintain healthy forests, significant assets in addressing climate change, British Columbia plants more than 200 million trees annually. Since its inception, the reforestation program has planted over 5 billion seedlings.

The Need for Action

Most climate scientists have concluded that global temperatures are rising and that most of the warming in the past 50 years is due to human activities that release greenhouse gases into the atmosphere. During the last 100 years, B.C. has experienced warming and changes in precipitation consistent with trends seen around the globe.

British Columbians are concerned about the effects of weather on their communities and natural resources. Recent extreme weather events, and their resulting effects, have included some very damaging droughts, forest fires, and floods.

The personal, economic and financial cost associated with these events is tremendous. The costs of fighting the Kelowna wildfires and rehabilitating burnt areas approached $500 million in 2003, not including timber losses. About $200 million of insured property loss was attributed to wildfires in B.C. during that year.

Because weather is naturally variable, the recent extreme weather events cannot be directly linked to global climate change. These recent events are nevertheless consistent with scientific expectations of the effects of climate change.

Climate scientists predict over the coming decades there may be more hot days in the summer, fewer cold days in the winter, warmer, drier summers in some regions, and changes in rain, snow and stream flow patterns.

A dramatic example of the impacts of longer term changes to weather patterns is B.C.'s mountain pine beetle infestation. The beetle's spread has been enabled by consecutive winters with unusually mild temperatures – it has not been cold enough to cause the normal level of winter beetle die-off.

It is prudent for B.C., as it is for other jurisdictions around the world, to take both actions that reduce provincial greenhouse gas emissions and actions that enable the province to adapt to anticipated climate change impacts.

Working with British Columbia's Strengths

B.C.'s development and production of clean and renewable energy, dating back over 50 years, and its significant investment in sustainable forest management are sources of strength for the province economically and environmentally. The Government of British Columbia's plan builds on these and other provincial strengths and opportunities:

- B.C. is a leader in clean energy production, energy efficiency, and hydrogen and fuel cell technology development. Continued leadership in these areas will mean B.C. is well placed to make progress on greenhouse gas reductions for itself and potentially for others around the globe.
- B.C.'s building sector is recognized as the Canadian leader in high performance building design and technology and the province has made a number of significant investments in improved transportation and infrastructure. Opportunities exist to reduce greenhouse gas emissions through more efficient communities, transportation and buildings.
- B.C. has invested millions of dollars in the management of its forests, which can act as carbon sinks, absorbing considerable volumes of greenhouse gases. The manner in which B.C. manages its forests is again vitally important to both our economic and environmental success.
- The Government of British Columbia is reducing its own operational emissions and anticipating and preparing for climate change impacts. The provincial government will continue to lower environmental impacts from its operations, and will work with other levels of government and private sector partners to assess regional climate change impacts, develop adaptation tools and increase knowledge and awareness about the need to adapt to climate change.
- B.C.'s network of lakes, rivers, wetlands and aquifers, fed by rain, snow and glacial melt-water, sustains the natural beauty and biodiversity of our environment, and meets our human and economic needs. The government is working to improve scientific understanding of water management issues related to climate change, develop practical tools and strengthen water management policies.

An Effective, Long Term Plan

This plan focuses on areas of provincial strength in addressing climate change and ensures B.C. will do its part in the global effort to reduce greenhouse gas emissions.

The plan recognizes that B.C. and the world are already seeing some amount of warming and climate-related impacts. Although global success in reducing emissions will slow the rate of climate change and limit the extent of the increase, these impacts are projected to increase.

As a result, Weather, Climate and the Future: B.C.'s Plan also focuses on preparing B.C. for the impacts of a warming climate and associated extreme weather. Anticipating climate change and the impacts of extreme weather, supporting research, developing appropriate indicators and planning tools, and raising awareness are all ways of improving provincial preparedness for climate change and extreme weather.

The Plan is designed to meet three objectives:

- Decrease greenhouse gas emissions and reduce the province's vulnerability to future climate change and weather extremes.
- Contribute to B.C.'s economic revitalization by improving energy efficiency, supporting the development of market opportunities and helping businesses prepare for climatic impacts.
- Ensure B.C.'s interests are protected in the implementation of national climate change policies.

SUMMARY OF ACTIONS

Sustainable Energy Production and Efficient Use

Action 1	The government will continue to implement the B.C. Energy Plan, which promotes alternative energy and investment in conservation and energy efficiency through a 50 per cent clean energy goal for new electricity demand, new rate structures and regulatory changes.
Action 2	An industry advisory group is helping to prepare a strategy to ensure that B.C. remains a leader in the development of hydrogen and fuel cell technology.
Action 3	The government will enhance energy conservation and alternative energy with a comprehensive energy strategy and facilitation of technology roadmaps for hydrogen and bioenergy.
Action 4	The government will work with large industrial emitters to ensure that federal greenhouse gas reduction targets are fair and to identify barriers and solutions to emission reduction measures.
Action 5	The government will work with trade and industry associations to promote greenhouse gas measures in smaller businesses, including eco-efficiency measures in smaller manufacturing plants.

Efficient Infrastructure: Transportation, Buildings and Communities

Action 6	Climate change will be incorporated into B.C.'s transportation planning and investment strategies.

Action 7	A provincial transportation demand management initiative will also address greenhouse gas reduction.
Action 8	As part of a Canada-B.C. partnership, the government is investing in international border crossings and other infrastructure to reduce congestion in the Lower Mainland.
Action 9	The government will consider further incentives to encourage the purchase of alternative fuels and hybrid vehicles.
Action 10	Driver information explaining how to reduce emissions will be improved.
Action 11	Work is underway to adapt building standards based on LEED™ (Leadership in Energy and Environmental Design) to the circumstances which apply in B.C.
Action 12	The government is updating minimum energy efficiency standards for equipment, and is conducting a review of energy performance in buildings.
Action 13	The provincial government will encourage local government action and will expand local government infrastructure planning grants.
Action 14	A remote communities clean energy initiative is underway to explore alternatives to diesel generators and fuel oil use in remote communities.
Action 15	The government will partner in selected leading edge high performance commercial buildings.

Sustainable Forest and Carbon Sink Management

Action 16	The government will continue to manage its forests in a sustainable manner, incorporating carbon management objectives where appropriate.
Action 17	The government will continue to assert ownership of any forest sink and associated benefits, and call for recognition of the cost of maintaining that sink.
Action 18	The government will develop a policy framework to provide business certainty and support the creation of incremental forestry sinks.
Action 19	The government will continue to improve understanding and protection of the forest carbon sink by supporting modelling and ongoing research, and will continue to protect this sink.
Action 20	The provincial government will enter into discussion with the Government of Canada on forest management mitigation strategies for mountain pine beetle.
Action 21	The government will improve fire protection for communities in British Columbia.
Action 22	The government will limit the economic and social costs of the mountain pine beetle outbreak.
Action 23	Under a B.C.-Canada agreement, provincial emissions from agriculture will be reduced by 8 per cent by 2008.
Action 24	The government will provide support to the B.C. Agriculture Council to implement best management practices on B.C. farms and ranches.

Government Leadership and Outreach

Reducing emissions

Action 25	The B.C. Buildings Corporation (BCBC) is conducting energy audits and retrofits of provincial buildings under a renewed energy management initiative.
Action 26	A new Higher Performance Building Policy will be applied to all new provincially funded buildings.
Action 27	The government will develop guidelines and performance targets for ministries and Crown agencies to acquire cleaner vehicles, fuels and transportation services.
Action 28	The government will encourage ministries and Crown corporations to incorporate emission reducing policies and guidelines in their service plans.

Adapting to climate change

Action 29	The government will address climate change and extreme weather in planning and operations.
Action 30	The government will implement effective monitoring and reporting procedures for climate change and its impacts in cooperation with partners.
Action 31	The government will help develop climate models and other tools for assessing climate change risks and adaptation options.
Action 32	The government will support applied climate change research that meets the needs of decision-makers.
Action 33	The government will participate in the development of capacity throughout B.C. to respond to extreme weather and climate change.

Reaching out

Action 34	The government will prepare and deliver an outreach strategy that supports adaptation and greenhouse gas reduction initiatives in the Plan.
Action 35	Joint initiatives will be pursued with other jurisdictions where these initiatives support government objectives.

Water Management

Action 36	The government is implementing the Drought Action Plan.
Action 37	Information and support is being provided to communities facing flood risks.
Action 38	The government is supporting climate science and the development of technical tools relating to water resources management.
Action 39	The government will support integrated watershed management to address water resource issues including drought and flooding.
Action 40	The government will work with partners to develop a coastal flood forecasting capability.

Introduction

Weather, Climate and the Future: B.C.'s Plan (the Plan) responds to the concerns British Columbians have about the effects of extreme weather events on our communities and natural resources. The Plan includes actions to reduce the environmental and economic losses associated with such events. These and other actions in the Plan will also help to reduce provincial vulnerability to future climate change, which may include changes in the frequency, severity, and duration of extreme weather events as well as changes in average temperature, precipitation, and other aspects of climate. In addition, the Plan includes actions to reduce greenhouse gas emissions and improve energy efficiency. This will support economic revitalization and contribute to reducing the emissions and the risks associated with future climate change.

The B.C. Plan responds to the concerns of British Columbians about recent extreme weather and its effects.

B.C. has faced weather extremes in recent years. In 2003, some parts of the coast and the southern interior experienced the most serious drought conditions in more than one hundred years. These dry conditions had been building in many areas for the previous three years. Very low stream flows and ground-water levels affected many water users in the province. Utilities rationed water, power was imported, cattle were culled and salmon died from water heat stress. A survey of 329 water systems, serving 3.3 million British Columbians, found that 84 systems, primarily in southern B.C., were stressed in terms of water supply. Although 2004 started out with a low snow pack and a generally early spring that led into summer drought conditions in many parts of B.C., relief came quickly with above average rains in August reducing stress on water systems and the threat from wild fires.

B.C. has faced two serious forest fire seasons in succession. In the order of a quarter of a million hectares burned in each of 2003 and 2004. In 2003, tinder dry forest conditions, and the inevitable lightning strikes and human carelessness led to some of the worst forest fires in B.C.'s history. Forest fires claimed three lives and more than 300 homes in what was the most expensive natural disaster in B.C. history. More than 50,000 residents were evacuated from the path of the fire and smoke, including one-third of Kelowna's population. Insured property losses were more than $250 million. Not counting timber losses the cost of fighting the fires and rehabilitating burnt areas approached $500 million. The 2004 fire season began earlier than in 2003, with many more fires burning throughout the spring and early summer than in 2003. Cooler weather and rain at the end of summer significantly reduced the number and size of end-of-season fires in the province.

Not counting timber losses, the cost of fighting the 2003 forest fires and rehabilitating burnt areas approached $500 million.

B.C. has also recently faced serious flooding. In 2003, soon after the last fires were extinguished, rains — perhaps the most severe in 200 years — hit the west coast causing major flooding on the Lillooet River near Pemberton and in other locations. Severe impacts were felt in the forestry, agriculture, fishing, transportation and the water supply sectors. Heavy rains returned in November, causing flooding in the Lower Mainland and a natural gas pipeline disruption affecting Prince Rupert.

Mountain pine beetles affected over 4 million hectares of forest in 2003 and the infestation continues to grow very rapidly. These beetles are a natural part of the forest ecosystem in B.C., but a combination of persistently mild winters and many large stands of mature lodgepole pines has resulted in a massive infestation. Of roughly 1 billion cubic meters of lodgepole pine in the province, an estimated 100 million cubic meters have been killed. The volume of dead wood is expected to increase fourfold by the end of 2004, and the timber supply around Quesnel to decline by about 29 per cent.

Weather has important impacts on the provincial and global economies.

As the events of 2003 illustrate, weather and climate are important to communities and to the provincial economy. Agricultural production and profits are sensitive to variability in temperature and rainfall. Fisheries depend on adequate instream flows, which in turn are related to precipitation and temperature. The oil and gas industry has historically relied on winters cold enough to keep the ground frozen in order to access sensitive sites for exploration and drilling. The tourism and outdoor recreation sectors depend on reliable seasonable weather and climate. The forest sector ultimately contributes to about one-quarter of B.C.'s economic activity, and all tree species are dependent on specific climate conditions in order to thrive.

Global economic losses from weather-related disasters increased more than 10 times between 1950 and 1999. Losses in the 1990s totaled $410 billion.

Although statistics are not available for B.C., nationally and globally the number and the cost of extreme weather events are increasing. Between 1950 and 2000, the number of weather-related disasters[1] in Canada increased from less than 30 to almost 120 per decade. During the same time period, the number of great weather disasters[2] world-wide increased from 13 to 72 per decade. The global statistics on economic and insured losses associated with these disasters demonstrate their significant costs.

Global Great Weather Disasters, 1950 - 1999
Losses in billion US $2000

Years	1950-59	1960-69	1970-79	1980-89	1990-99
# of Disasters	13	16	29	44	72
Economic Losses	39.8	52.3	76.7	121.8	410.0
Insured Losses	0	6.9	11.1	22.2	95.2

Source: NatCanSERVICE Munich Re, R&D/Geo - February 2001

Only time will tell whether the extreme events of 2003 reflect a weather anomaly, or a longer, more permanent term trend towards warmer, drier summers and more extreme precipitation events in parts of B.C. Such a trend, however, would be consistent with the projections of scenarios developed to look at climate change. There is clear evidence that the global atmosphere is warming. The vast majority

of climate scientists have concluded that most of the warming observed in the past 50 years is due to human activities that release greenhouse gases[4] into the atmosphere. Atmospheric warming is expected to produce long term changes in average temperature, precipitation, and other aspects of climate, as well as changes in the frequency, severity, and/or duration of extreme weather events.

The government response to recent extreme weather events will have the added benefit of preparing British Columbians for a warmer, drier future. The government is also developing provincial capacity to prepare for future climate change, and reducing emissions of the greenhouse gases that are associated with such change.

The government has responded quickly to recent extreme weather events.

The government has released a Drought Action Plan[5] that provides local governments with the tools and resources they need to manage local water supplies and plan for potential shortages. To decrease provincial vulnerability to forest fires, the government has prepared a Fire Action Plan[6] that implements all 47 recommendations of an independent review team[7]. The government has also set in place a Mountain Pine Beetle Management Plan[8] that will limit further damage to forests, recover value from damaged timber, and foster emerging forest-based activities in response to mountain pine beetle. The Government of B.C. is spending more than $100 million a year, on average, in planning and implementing all necessary responses to droughts, floods, forest fires, and forest pests.

B.C. is developing the knowledge, tools, and skills to prepare for climate change.

B.C. was the first jurisdiction in Canada to produce a comprehensive, scientifically reviewed report on historic climate trends and their impacts.[9] The government supports ongoing development of the information, tools and skills to prepare for climate change. This includes work to improve climate monitoring and to develop climate models that can better project future regional impacts, and methods for incorporating climate considerations into risk management. Provincial agencies participate in and support research that addresses climate change and its impacts. The government is working to ensure that climate and hydrological monitoring networks can provide the information needed to understand and prepare for these impacts. The government continues to build strategic partnerships with First Nation and other governments, communities, business, researchers, and other stakeholders in order to share information and resources for adaptation.

Several municipalities are preparing flood and drought management strategies, assessing potential impacts on infrastructure and exploring water management options in response to current risks and potential future risks posed by climate change. BC Hydro is also taking account of climate variability and future climate conditions in planning operating strategies. The Oil and Gas Commission has done a preliminary assessment of potential impacts of future climate conditions on exploration and drilling, and concluded that a shorter winter season will increase costs and environmental impacts.

B.C. is a leader in taking action on greenhouse gas emissions.

B.C.'s current per capita greenhouse gas emissions are among the lowest in Canada. This reflects the province's early investment in hydroelectric generation and the industrial use of other renewable energy sources like wood residue in the forestry sector. B.C.'s industries, such as forestry and smelting, have taken significant steps to improve their energy efficiencies and thus lower their greenhouse gas emissions. BC Hydro is a world leader in encouraging energy conservation and efficiency through its Power Smart program. BC Hydro has committed to meeting one-third of the province's projected growth in demand for electricity services by improving efficiencies in electricity use.

B.C.'s building sector leads the rest of Canada in high performance building design and technology. Some of the world's most innovative urban planners are located in B.C. In 2003 Cities[PLUS] from Vancouver led a cross-Canada team in winning first place in a major international sustainable urban planning competition for a submission based on the Lower Mainland.

Provincial policies encouraging community-based land and water use planning and growth management for cities contribute to good resource use and more livable communities throughout B.C.

Hydrogen technologies can contribute significantly to future reductions of greenhouse gas emissions. The world's largest cluster of hydrogen and fuel cell companies is located in the province. The government is championing a Hydrogen Highway that will tie together research facilities, while showcasing fuel cell vehicles, refueling stations and stationary power applications in the run-up to and beyond the 2010 Olympic and Paralympic Winter Games.

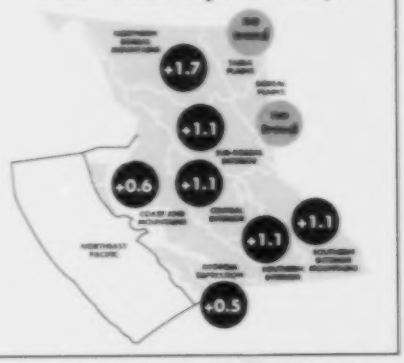
The world's largest cluster of hydrogen and fuel cell companies is located in British Columbia.

B.C. also leads Canada in modeling and research into understanding the province's contribution to the national forest carbon balance.

British Columbia's Climate: Changes, Impacts and the Provincial Response

There is evidence that B.C.'s climate has changed over the past century and that physical and biological systems have been affected. Average annual temperature warmed by 0.6 degrees Celsius (C) at the coast, 1.1 degrees C in the interior, and 1.7 degrees C in the north between 1895 and 1995. Atmospheric warming is associated with long-term changes in other aspects of climate, including precipitation, air, wind and ocean currents, and the water cycle.

Change in Annual Temperature 1895 - 1995 (°C per century)



Source: Ministry of Water, Land and Air Protection

Analysis of historical data also indicates changes in freshwater, marine and terrestrial ecosystems that are linked to climate. Lakes and rivers now become free of ice earlier in the spring, on average, while at least two large glaciers in southern B.C. have retreated by more than a kilometre each. The Fraser River discharges a larger share of its total annual flow sooner in the year. Average sea levels have risen by 4 to 12 centimetres along most of the coast, and high water sea levels in the Vancouver area increased by 16 to 34 centimeters during the last century. Average coastal sea surface temperatures are 0.9 degrees C to 1.8 degrees C higher. More heat energy is available for plant and insect growth.

Climate change is associated with the buildup of greenhouse gases in the atmosphere.

The changes observed in B.C. fit a broader pattern of change observed around the globe during the 20th century. The vast majority of climate scientists have concluded that the global atmosphere is warming and that most of the warming observed in the past 50 years is due to human activities that release greenhouse gases into the atmosphere. The present concentration of carbon dioxide – one of the most important greenhouse gases – is approximately 34 per cent higher today than in pre-industrial times. Greenhouse gases, including those emitted from the combustion of fossil fuels, trap solar energy, which leads to gradual warming of the earth's atmosphere. This warming is expected to produce long-term changes in average temperature, precipitation and other aspects of climate, as well as changes in the frequency, severity, and/or duration of extreme weather events. Although climate change appears to be gradual at the global scale, atmospheric warming may in future trigger abrupt changes in regional climate.

The climate is expected to continue to change at a faster rate, with varying impacts on different regions.

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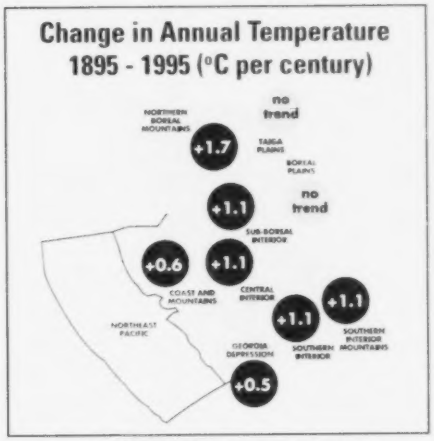

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The projected global rate of warming is much faster than observed changes during the 20th century, and likely faster than at any time during the past 10,000 years. The actual rate of warming will depend on how fast greenhouse gases continue to accumulate in the atmosphere, and how the climate system responds. The impacts of climate change will vary from one region to another. Climate change scenarios indicate that during the 21st century British Columbians could expect average annual temperatures to warm somewhere in the range of 2 degrees C to 7 degrees C, accompanied by more winter precipitation, and a greater proportion of winter precipitation falling as rain.

Projected impacts for B.C. include reduced snow pack in southern B.C. and at mid-elevations, an earlier spring meltwater surge on many snow-dominated river systems, reduced summer stream flows and soil moisture in some regions, glacial retreat and disappearance in southern B.C., an increase in the weather conditions that support fire and pest outbreaks and other disturbances, and loss of some wetland and alpine ecosystems. Also projected are changes in the frequency and/or severity of drought, high intensity rainfall, flooding, coastal storms, and other extreme weather events.

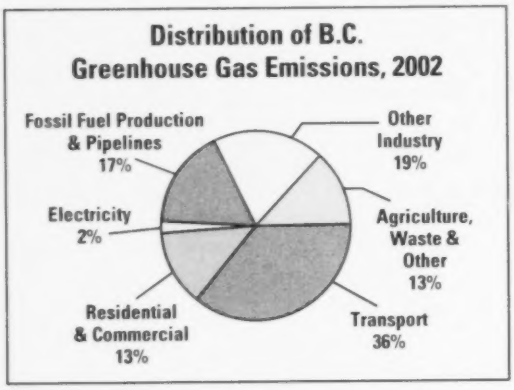
These projected changes could have important social, economic, and environmental effects.

- Many B.C. communities could be more at risk from flooding. The greatest concern is for infrastructure and housing in communities near the mouth of the Fraser River and other low-lying coastal areas that are exposed to a combination of rising sea levels and coastal storm surges. Parts of this floodplain, currently protected by dikes, are already below sea level.
- Sea level rise and salt water intrusion into groundwater supply could become a problem for agricultural and domestic users in parts of the Fraser River delta. Sea level rise also threatens coastal ecosystems, infrastructure and archeological sites.
- Extreme precipitation events threaten the quality of some drinking water supplies, and may de-stabilize slopes, flood wells, and overwhelm stormwater and sewage infrastructure.
- Forestry operators in some areas can more routinely expect a longer fire season and increased damage from forest pest infestations.
- Lower summer river flow volumes put certain fish stocks at risk, threaten drinking water quality in some communities, and increase the likelihood of water use conflicts between fisheries, communities, agriculture, hydroelectric generation and other industries.
- Higher sea surface temperatures may reduce ocean productivity and change the distribution and survival of commercial fish species, including salmon.
- Low-elevation ski resorts may experience a shorter ski season or no snow at all, due to warmer winter temperatures.
- Warming may contribute to rising health impacts and health care costs for heat-related illnesses, smog-related respiratory disorders and new vector-borne diseases.

Ongoing climate change will almost certainly affect key parts of the provincial economy. The nature and intensity of the impacts will depend on the location, activity, time period and geographic scale involved. However, the risk of serious negative consequences is expected to increase with the magnitude and rate of change.

An overall response includes reducing both vulnerability and greenhouse gas emissions.

Climate models project that the excess greenhouse gases already in the atmosphere will continue to affect the global climate for centuries to come. Since further climate change is likely inevitable, an overall response must include measures to reduce vulnerability to negative effects, and allow us to take advantage of any positive effects. At the same time, unless there is a reduction in greenhouse gas emissions, we may have to adjust to significant change over a period of decades. A comprehensive response should therefore also include the reduction of greenhouse gas emissions on a global scale. Each jurisdiction, regardless of size, has a role to play in this reduction effort. Reducing emissions is expected to slow the rate of climate change, and thus the timing of its impacts on ecological, social and economic systems. Given the scale of the potential impacts, it is in B.C.'s long-term interest to take cost-effective measures to both reduce vulnerability to these impacts and contribute to global efforts to reduce greenhouse gas emissions. Resulting improvements in energy efficiency will also spur the development of economic opportunities in new technologies, practices, and energy sources.



Note: Total B.C. emissions 67.5 million tonnes CO_2 equivalent
Source: Natural Resources Canada

The Plan supports the provincial drive for economic revitalization, with a long-term strategy to minimize risks and maximize benefits to the province.

Since extreme weather events and climate change will almost certainly be important in the years to come, the government has developed a plan that is long-term, flexible in adapting to changing conditions, and open to new opportunities and new partnerships. This Plan is a reasoned long-term strategy that reduces vulnerability to extreme weather and other impacts, and supports greenhouse gas reduction. It also allows B.C. to take advantage of the significant opportunities from climate-related action. The Plan complements and integrates other provincial initiatives, including the Drought Action Plan, the Mountain Pine Beetle Action Plan, the Energy Plan,[9] the Transportation Plan,[10] the Community Charter,[11] the Premier's Technology Council,[12] the Heartlands Economic Strategy[13] and the Agricultural Policy Framework.[14]

Key policy objectives and screening criteria guide development of the Plan.

The Plan is designed to meet three objectives:

- **Risk Management** – The Plan supports responsible action on the part of the government and its partners to reduce the environmental and economic costs of extreme weather and climate change, including associated insurance costs. The Plan also supports reasonable action to address the economic risks of greenhouse gas reduction, including the vulnerability of businesses to regulatory, shareholder and market pressures, and the lost economic opportunities as new markets develop.
- **Economic Revitalization** – The Plan will contribute to B.C.'s economic turnaround by creating business certainty for investment and building on provincial competitive advantages. It includes actions that can reduce costs, assist in securing strategic market positions for business, help business and communities prepare for weather extremes, and support development of economic opportunities in domestic and export markets.
- **Federal Engagement** – The Plan identifies government priorities and provides the basis for engaging the federal government. It helps ensure that B.C. receives a fair deal in the implementation of national climate change policies. The government will continue working with business and the federal government to address the costs associated with the federal climate change plan, take full advantage of partnerships, and work to ensure that national actions are in line with provincial priorities.

The following criteria were used to screen actions in this Plan:

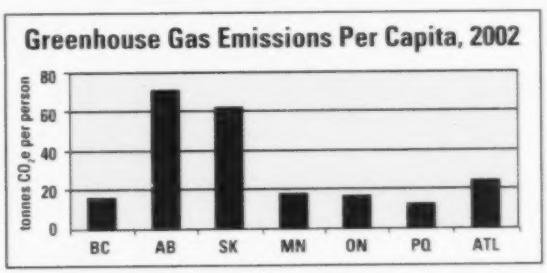
- Any changes to regulatory requirements will be consistent with the government's initiative to streamline regulation.
- Measures in the Plan will contribute to B.C.'s long-term economic, social and environmental well-being.
- Measures in the Plan are compatible with government plans to address drought, fire, flood, and other risks related to extreme weather and will help reduce provincial vulnerability to climate change.
- An integrated approach will be adopted that considers the interactions between measures, positive and negative, across all sectors over the short to long term.
- Actions will be informed by those undertaken in neighbouring jurisdictions, in particular Alberta and the states of Oregon and Washington.
- Joint initiatives will be pursued with other jurisdictions where they support Government of British Columbia objectives.
- The Plan will be applied in a manner compatible with the Ministry of Sustainable Resource Management's draft Sustainability Principles.[15]

B.C. currently ranks third lowest after Prince Edward Island and Quebec on the basis of greenhouse gas emissions per capita. The government's aggregate emissions target is to maintain or improve upon this third place ranking relative to other provinces. This target is consistent with the B.C. Progress Board's use of per capita greenhouse gas emissions as an indicator of provincial environmental performance. In addition to the aggregate target, specific emissions-related targets will be set for agriculture, buildings, government operations, and other sectors. Such targets can be effective in strengthening action and can be reasonably measured and verified.

An aggregate emission reduction target will maintain or improve B.C.'s ranking as the third lowest per capita greenhouse gas emitter in Canada.

The actions in this Plan, together with those in the federal Climate Change Plan for Canada,[10] are expected to reduce provincial greenhouse gas emissions. However, because of the uncertainties with respect to federal actions, future international commitments and the introduction of new greenhouse gas-reducing technologies, the determination of a quantitative emission reduction target is considered to be neither feasible nor meaningful at this time.

The following sections of this Plan outline in more detail the ways in which the government is responding to extreme weather events, preparing for a different climate future, and reducing greenhouse gas emissions.



Source: Natural Resources Canada

Energy, Industry and Small Business

The government is committed to cost effective actions that both address greenhouse gas emissions and enhance competitiveness in key economic sectors – energy production, large industry and small to medium-sized businesses. The government is also committed to supporting these sectors in managing risks associated with extreme weather and climate change.

B.C.'s major energy industries (electricity, natural gas, oil, coal) employ about 35,000 people and provide more than $3 billion annually in direct provincial revenues. Vast hydrocarbon resources, including an estimated 115 trillion cubic feet of natural gas, 18 billion barrels of oil and 23 billion tonnes of coal, remain largely untapped. There is also considerable undeveloped potential for large-scale hydroelectric power and alternative energy, including small hydro-power, wind, biomass, solar, tidal, wave and geothermal energy. The 2002 provincial energy policy, Energy for Our Future: A Plan for B.C., calls for the development of these resources to support energy and economic diversification, and security throughout the province.

Mining, smelting, chemical, cement and lime operations and other large industries, excluding the forest and energy sectors contribute over $4 billion to the provincial economy and provide direct employment for about 10,000 people. The small business sector contributes 28 per cent of GDP and employs some 931,000 people, representing 58 per cent of private sector jobs in B.C. Although concentrated more heavily in the southwest, small businesses provide economic opportunity throughout B.C.

The province's strengths in energy efficiency, alternative energy and new technologies will be developed to help offset the emissions growth from an expanding hydrocarbon sector.

The development of B.C.'s energy resources is a priority of the Energy Plan and a key factor in B.C.'s economic health. An expanding oil and gas industry is adding to provincial emissions. But this industry also contributes to reducing greenhouse gas emissions elsewhere in North America because B.C.'s natural gas exports displace higher carbon fuels. Although the B.C. electricity industry is one of the lowest emitters on the continent, emissions can fluctuate, depending on river flows and the need to add natural gas fired generation in low water years. The province has huge resources of clean, alternative energy, including small hydropower and substantial potential for wind, biomass, solar, tidal, wave and geothermal energy. There is also considerable potential for increased conservation and energy efficiency, building on the experience of Power Smart and other utility programs. Ultimately, new cleaner hydro-carbon, alternative energy and energy efficient technologies are needed for long-term greenhouse gas reduction.

The provincial government will support large industrial emitters as the federal government sets greenhouse gas reduction targets, and will not impose any further regulatory burden on these emitters. It will also provide support to smaller businesses to realize their greenhouse gas reduction opportunities.

While B.C.'s other large industries (i.e., other than the forestry and energy sectors) have made progress in reducing their greenhouse gas emissions, a number of these sectors – mining, smelting, chemicals, cement and lime production – face intense competition in world markets as well as capital and technological hurdles to further emission reduction. As part of its Climate Change Plan for Canada, the federal government is proposing to set greenhouse gas reduction targets for large industry. Small to medium-sized businesses, on the other hand, have significant opportunities for energy savings and greenhouse gas reduction, but face their own unique knowledge, technical and financial challenges. These smaller businesses need assistance from governments, trade associations, the financial community and other partners to overcome their barriers to climate change action.

The government will help business manage climate-related risks.

Businesses in B.C. have started to look at the risks associated with increased weather variability and longer-term climate change, and at adaptation options. BC Hydro is taking account of existing climate variability in planning reservoir operations, and looking at potential adaptive reservoir operating strategies. The Oil and Gas Commission has done a preliminary assessment of climate change impacts on exploration and drilling, concluding that a shorter winter season will increase costs and environmental impacts.

The government is supporting development of information and tools that will help business, industry, and others identify and manage climate-related risks. This includes work to increase information about potential impacts of climate change on British Columbia, and maintenance of an effective climate monitoring network.

Action 1: The government will continue to implement the B.C. Energy Plan, which promotes alternative energy and investment in conservation and energy efficiency through a 50 per cent clean energy goal for new electricity demand, new rate structures and regulatory changes.

B.C.'s goal to meet 50 per cent of new electricity demand with clean sources is the first of its kind in Canada. Clean energy sources include renewable energy, cogeneration of heat and power, energy from municipal solid waste, and efficiency improvements at existing facilities. The goal will be taken into account by the regulator when overseeing the acquisition of new resources.

In accordance with the B.C. Energy Plan, BC Hydro will establish stepped rates for industrial customers that charge a higher price for the last 10 per cent of electricity consumed. This will encourage customers to meet part of their energy needs through efficiency improvements, generation of their own power, or purchases from independent producers. In addition, the Utilities Commission Act has been amended to remove a disincentive for energy distributors to invest in conservation and energy efficiency.

Action 2: An industry advisory group is helping to prepare a strategy to ensure that B.C. remains a leader in the development of hydrogen and fuel cell technology.

The Lower Mainland is home to one of the largest clusters of fuel cell and hydrogen expertise in the world, with more than 1,200 people directly employed in the industry. Global demand for fuel cells and related products is projected to reach $46 billion by 2011, and could exceed $2.6 trillion by 2021.[17] B.C. profits from a ready supply of energy for generating hydrogen, including abundant hydrocarbon resources that can provide the transition to a hydrogen economy supported by renewable energy.

The Premier's Technology Council has emphasized the need to develop key technology sectors, including life sciences and alternative energy. As an offshoot of the council, an industry advisory committee has produced a Hydrogen and Fuel Cell Strategy that sets goals and milestones for the coming decades and measures to achieve them. The strategy highlights areas such as public-private partnerships for technology demonstration and ways to make B.C. a centre for learning and excellence in hydrogen and fuel cell technologies.

Action 3: The government will enhance energy conservation and alternative energy with a comprehensive energy strategy and facilitation of technology roadmaps for hydrogen and bioenergy.

An Alternative Energy and Energy Efficiency Strategy will be prepared to specify provincial goals and objectives with respect to reducing energy demand and developing alternative energy resources in B.C. A priority policy area will be the development of bioenergy from softwood residues and other organic wastes. Examples of policies to be considered include energy efficiency targets for utilities and other sectors; regulatory streamlining for alternative energy projects; procedures to ensure access to land for project developers; creative mechanisms for funding research, development and demonstration; and incentives for the purchase of energy efficient and alternative energy equipment.

The government will also facilitate preparation of technology roadmaps in the areas of fuel cells and hydrogen, and bioenergy. These roadmaps will draw on industry and academic expertise to assess the long-term technology requirements of these target industries and outline a plan for acquiring the necessary technologies.

Action 4: The government will work with large industrial emitters to ensure that federal greenhouse gas reduction targets are fair and to identify barriers and solutions to emission reduction measures.

Many industrial facilities have already taken action and reduced their greenhouse gas emissions. Some operations are under extreme competitive pressure, with virtually no technological or production

process options to significantly reduce emissions in the short to medium term. The government will work with affected industries to ensure that:

- The allocation of the target burden by the federal government is equitable;
- Those who have acted early are not put at a disadvantage;
- Clean energy and energy efficiency are appropriately credited; and
- Issues of competitiveness are taken into account.

Industry and government will identify policies, regulations and other constraints that impede the substitution of low-emitting fuels and technologies and other opportunities in industrial operations. Options will be developed for removing barriers, including partnerships to help industries achieve further greenhouse gas reductions. The potential emission reductions, energy cost savings and other co-benefits will be assessed.

Action 5: The government will work with trade and industry associations to promote greenhouse gas measures in smaller businesses, including eco-efficiency measures in smaller manufacturing plants.

Useful materials and tools to support this action include energy efficiency primers for smaller companies, guides for choosing technical consultants, eco-efficiency financing directories, case studies of greenhouse gas reduction projects, and a website collecting these and other small business resources. Resources will be gathered with the help of trade and industry associations, utilities and other partners.

Eco-efficiency improvements help provincial companies become more competitive while benefiting the environment. The Eco-Efficiency Partnership Program has been successful in leveraging significant cost and emission savings through the provision of relatively inexpensive technical support. The government will continue to explore options for supporting eco-efficient process changes at smaller manufacturing plants in B.C.

Examples of B.C. energy, industry and business sector activities

1. Duke Energy has completed three acid gas reinjection projects at facilities in northeastern B.C., with annual greenhouse gas emission savings of approximately 140 kilotonnes.
2. In 2001 Husky Energy undertook a project to reduce fuel gas flaring at its Prince George refinery, reducing emissions by 2,500 tonnes annually.
3. By rebuilding its Richmond cement plant with new technology in 1999, Lafarge reduced combustion-related greenhouse gas emissions per tonne of clinker by more than 25 per cent.
4. VanCity Credit Union offers energy efficiency loans tailored to businesses, and is the first financial institution in Canada to introduce a low-interest Clean Air Car Loan for hybrid vehicles.

Transportation, Buildings and Communities

Transportation and buildings are responsible for about 50 per cent of B.C.'s greenhouse gas emissions. These infrastructure-based sectors also face significant challenges as a result of shifts in weather and climate patterns, including the potential for increased drought, interface fires, flooding, and terrain shifting.

Transportation is vital to the provincial economy and plays a leading role in the livability of B.C. communities and the quality of life British Columbians enjoy. B.C. needs an efficient transportation system to access natural resources, transport goods and services to market, and move people from within and outside its boundaries. In 2001, exports valued at $31.8 billion were shipped over this system, while visitors spent $9.2 billion travelling in the province.

Construction is one of B.C.'s largest industries, with approximately 120,600 workers, or 6 per cent of total employment. The industry has gross annual sales in the order of $5.8 billion, amounting to 5 per cent of provincial GDP. Building permits for construction totalled about $5.7 billion in 2002, of which commercial buildings accounted for $1.1 billion, institutional and government buildings for $0.4 billion and almost 24,800 residential dwelling units for the remainder.

Transportation is a challenging sector for greenhouse gas reduction, but actions can be taken that cut emissions, improve efficiency, reduce congestion and provide other benefits.

A transportation network that ensures the effective flow of people, goods and services is critical to revitalizing the provincial economy and improving the quality of life. Transportation is a complex sector for greenhouse gas reduction, involving many dispersed decision-makers and influenced by all levels of government. Nonetheless, increasing transportation efficiency can mitigate emissions while providing other benefits, such as reduced traffic congestion, operating cost savings and improved local air quality. Various measures are available for reducing vehicle emissions, including transportation demand management, better land use planning, strategic transit and road investments, and the use of lower-emitting vehicles and fuels. Air, rail and marine transport also have significant potential for energy efficiency, fuel-efficient engine technologies, onshore electrical power systems and other measures. Federal support for increased vehicle efficiency and funding partnerships is key to significant future reductions.

Concerted action by the provincial government, local governments and others is essential to reducing emissions through better community planning and development and building practices.

A comprehensive, integrated approach to community planning and efficient transportation, buildings and other infrastructure is key to reducing B.C.'s overall emissions levels. Well-designed communities and high performance buildings provide multiple economic, social and environmental benefits. Growth

management remains a major challenge for B.C.'s urban centres, while remote communities face issues of energy cost, reliability and economic development. Although B.C. communities, businesses and individuals have made inroads in several areas – notably, "smart growth," community energy planning and building energy efficiency – concerted action is needed to overcome further barriers and take advantage of opportunities.

The government is supporting the development of tools that will help local governments, developers, transportation planners and others manage risks associated with extreme weather and climate change.

Awareness of climate change impacts is growing at the technical and engineering level within some local governments. For example, the City of Richmond is preparing a comprehensive flood protection and management strategy that will address issues such as climate-induced sea level rise, river flooding potential, minimum flood elevation standards, and options for enhancing the flood protection diking system. The Greater Vancouver Regional District (GVRD) has considered the potential impacts of climate change in its water supply planning, evaluation of stormwater management, and some drainage and sewerage system plans.

The government has set in place measures to help communities respond to recent extreme weather events. The provincial Drought Action Plan provides local governments with the tools and resources they need to manage local water supplies and plan for potential shortages. The government web site identifies ways individuals and communities can reduce water use. The government is also undertaking work that will increase information about future regional impacts of climate change and help communities manage the risks associated with future climate and weather variability. This includes development of a water balance model that will help planners and developers implement stormwater drainage systems that minimize runoff.

Action 6: Climate change will be incorporated into B.C.'s transportation planning and investment strategies.

The Ministry of Transportation's investment strategies support economic development and competitiveness throughout the province.

Climate change policy will be dovetailed into the overall transportation policy direction. Some preliminary areas have been identified where there is potential to reduce transportation costs and transit times and at the same time cut fuel use and greenhouse gas emissions:

- Improving the integration of transportation modes (e.g., transit buses and Vancouver SkyTrain, railways and port facilities) and inter-modal efficiencies;
- Reducing goods congestion in urban and border areas (e.g., through strategic road infrastructure upgrades); and

- Encouraging transportation information technologies (e.g., signal synchronization, road condition information, satellite tracking for vehicles).

Action 7: A provincial transportation demand management initiative will also address greenhouse gas reduction.

The provincial government will work with local and regional governments, TransLink, B.C. Transit and other agencies on a coordinated transportation demand management initiative. One element of this initiative will be finding ways to enhance public transit systems and make strategic road improvements to reduce congestion. Other elements for consideration include dedicated lanes for buses, parking management policies, intelligent transportation systems for roads and transit, and increased cycling infrastructure.

Action 8: As part of a Canada-B.C. partnership, the government is investing in international border crossings and other infrastructure to reduce congestion in the Lower Mainland.

Infrastructure investment is needed to ease congestion, thus reducing unnecessary engine idling, at the international border and improve trade corridors within B.C. More than $200 million will be invested for eight highway accesses leading to border crossings. The improvements will be jointly funded by the governments of Canada and British Columbia. This investment will relieve congestion, facilitate the safe and efficient movement of goods and people, and reduce greenhouse gas emissions and other airborne pollutants.

Action 9: The government will consider further incentives to encourage the purchase of alternative fuels and hybrid vehicles.

Existing provincial incentives will be reviewed and recommendations will be made on modifying those incentives to promote further adoption of greenhouse gas-reducing fuels and vehicles in B.C.

Action 10: Driver information explaining how to reduce emissions will be improved.

Drivers can realize significant greenhouse gas savings by practicing better driving and vehicle maintenance. Examples of these practices include reduced idling, slower acceleration and deceleration, and maintaining proper tire pressure. Many resources are available on the Internet related to driver education and training. This information will be added to Ministry of Transportation and Insurance Corporation of British Columbia (ICBC) driver training materials.

Examples of B.C. transportation activities

1. CN Rail and CP Rail share 250 kilometres of track through the geographically challenging Fraser Canyon, reducing fuel consumption and greenhouse gas emissions while ensuring more efficient train operations.
2. After three years of operation, the Kamloops Travel Smart program reduced planned road expenditures by approximately $100 million, and greenhouse gas emissions by three per cent.
3. The Vancouver Airport Authority has made various energy efficiency improvements and is investigating the use of high efficiency LED lights for aircraft maneuvering areas.
4. Translink, the Greater Vancouver transportation authority, includes expanded public transit, increased funding for cycling infrastructure, and resources for an intelligent transportation system and a commuting options program in its current plan.
5. In March 2003, Technology Partnerships Canada made a strategic project investment of $18.9 million in Westport Innovations to support the development of high-performance, low emissions engines for vehicle applications.

Action 11: Work is underway to adapt building standards based on LEED™ (Leadership in Energy and Environmental Design) to the circumstances that apply in B.C.

As of December 2003, there were 1053 US and 58 Canadian LEED™ registered projects, with 31 projects and 257 LEED™ accredited professionals in B.C. This building rating system is successfully transforming the industry because it provides a self-assessment tool for design teams and owners to identify high performance strategies, measure and monitor progress, and record achievement. Moreover, it recognizes the range of goals that motivate design decisions, such as building more efficiently, optimizing resource use and maximizing occupant health and comfort.

The Ministry of Small Business and Economic Development, B.C. Buildings Corporation (BCBC), the City of Vancouver, the Greater Vancouver Regional District, BC Hydro and Terasen Gas coordinated a B.C. adaptation of LEED™, which was formally launched in April 2004. Following its launch, the government and BCBC will continue to work on an outstanding issue of how LEED™ treats certified wood.

Action 12: The government is updating minimum energy efficiency standards for equipment, and is conducting a review of energy performance in buildings.

The government is updating minimum energy efficiency requirements for building equipment. Minimum efficiency standards already apply to appliances, heating and cooling equipment, lighting and

other energy-using devices. Work is underway to update the standards by identifying new opportunities that are appropriate to B.C., evaluating the economic impact of prospective new requirements, and aligning with federal and other provincial standards where appropriate. In addition, redundant or outdated standards will be eliminated.

The government has committed to work with the building industry, governments and others to improve energy use in buildings. With respect to new buildings, a process has begun to evaluate barriers to energy efficiency, review the current energy performance standards for houses in the B.C. Building Code, and consider initiatives of other provinces and the federal government. In cooperation with stakeholders, the government will also review options to enhance energy efficiency in existing buildings.

Action 13: The provincial government will encourage local government action and will expand local government infrastructure planning grants.

The Ministry of Community, Aboriginal and Women's Services will encourage municipalities to set GHG emission reduction targets for inclusion in official community plans and regional growth strategies. This is a requirement of the Federation of Canadian Municipalities (FCM) Partners in Climate Protection Program. The Ministry of Water, Land and Air Protection will help regional districts and local governments to coordinate and streamline airshed management plans, community energy plans, and climate change action plans.

The government will support municipalities in establishing practices that promote and reward more efficient communities and buildings. Practices, such as encouraging infill development in established urban areas, can significantly reduce the costs of growth-related infrastructure and lead to lower development cost charges.

There is already a wealth of information available within and outside B.C. about smart growth and green development. This information can be made more accessible and can be supplemented by new tools where gaps exist. For example, the government will support the development of

- A best practices guide for incorporating energy efficiency and alternative energy measures into the planning and construction of water and sewer infrastructure,
- Consistent energy performance targets for commercial and institutional buildings, and
- Planning and other tools to facilitate local government progress through the Partners in Climate Protection milestones.

Local governments can get infrastructure grants (under the provincial Local Government Study Grant Program) to study the feasibility and technology of proposed water and sewer facilities. The government will expand these traditional feasibility and study program grants to cover the planning of other infrastructure, such as community energy systems and municipal energy generation (e.g., landfill gas projects). In addition, the government with require all water and sewage projects to consider energy efficiency and water conservation. The government also helps fund green infrastructure (i.e., capital) projects under the Canada/B.C. Infrastructure program.

Action 14: A remote communities clean energy initiative is underway to explore alternatives to diesel generators and fuel oil use in remote communities.

Government is committed to reducing energy costs and providing other benefits in communities where emissions per capita are the highest. Work by BC Hydro, the Pembina Institute and others has laid the foundation for community energy planning processes in these communities, many of them First Nations. The government will help with access to technical support and funding sources for community energy planning, energy efficiency and alternative energy development (e.g., federal climate change funds), and will establish monitoring to measure the impacts of actions taken. Where possible, this work will be tied to existing government incentives to facilitate expansion of oil, natural gas and mining development in rural areas.

Action 15: The government will partner in selected leading edge high performance commercial buildings.

Leading edge high performance buildings, as well as being energy efficient, can be designed to produce as much energy as they consume on average over a year. The Sustainable Development Research Initiative at the University of British Columbia (UBC) is spearheading a proposal to develop a Centre for Interactive Research on Sustainability, where the building would be a net energy producer and would serve as a laboratory for next-generation green building technologies. The government is currently backing this proposal together with the Greater Vancouver Regional District (GVRD), BC Hydro and other partners.

Examples of B.C. community and buildings actions

1. The City of Vancouver formed the multistakeholder Cool Vancouver Task Force to help develop a comprehensive citywide initiative for reducing greenhouse gas emissions.
2. The Gitga'at First Nation is working to implement a sustainability plan that includes investment in alternative energy, energy efficiency, and greenhouse gas reduction to help diversify its economy and create new wealth.
3. The UBC Sustainable Communities Program, Smart Growth B.C. and the Real Estate Institute of B.C. have launched a multi-year project to demonstrate "smart growth on the ground" principles in selected provincial communities.
4. A state of the art renovation at Telus' Vancouver head office saves an annual 520 tonnes of greenhouse gas emissions. By re-using steel and concrete during the renovation, Telus also avoided 15,300 tonnes of greenhouse gas emissions that would have been emitted had new materials been used.
5. BC Hydro through its Power Smart program works with numerous municipalities to help them to identify cost-effective energy efficiency opportunities, and apply for incentive funding, and provides technical, financial and training support.

Forest Management, Agriculture and Biological Carbon Sinks

Forestry and agriculture are foundations of the economy and support many B.C. communities. Forestry and related manufacturing make up 25 per cent of British Columbia's economic activity and 22 per cent of employment, with about 87,000 people directly employed in 2003. Agriculture accounts directly for about 1.5 per cent of the total workforce, and generates significant spin-offs in the food processing, retailing and service sectors. B.C. farms sold an estimated $2.2 billion in agricultural products in 2003.

The forest and agricultural sectors emit greenhouse gases through the burning of fossil fuels for energy, methane produced by livestock and nitrous oxide from fertilizers and manure. Over the past several decades, B.C. forest companies have made energy efficiency improvements and switched production to more efficient pulp mills. Between 1990 and 1999, sectoral emissions fell by 29 per cent, while production grew by 21 per cent.

The forest and agricultural sectors emit greenhouse gases through the burning of fossil fuels for energy, methane produced by livestock and nitrous oxide from fertilizers and manure.

Both sectors are also sensitive to climate. Climate change scenarios suggest that B.C. will experience increasingly warm average temperatures during the 21st century. Projected long term impacts include increases in the conditions that support fire and pest outbreaks. In addition, long term climate change could affect forest productivity and the distribution of tree species. It could also increase the potential for agriculture in more northern areas of B.C.

Both sectors, but particularly the forest sector, also have an impact on biological sinks. Biological sinks are vegetation and soil that absorb and store carbon from the atmosphere.[18] Carbon is sequestered into these sinks through photosynthesis and is lost from them through disturbances such as harvesting, tilling, fire and pests. Practices that increase forest growth rates, reduce tree mortality, reduce soil disturbance and manage nutrients all contribute to carbon storage in forests and soils.

Both sectors, but particularly the forest sector, also have an impact on biological sinks.

Government has acted to reduce the impacts of weather extremes and future climate on the forest and agriculture sectors.

Record-breaking hot dry weather during the summer of 2003 resulted in more than 2,500 wildfire starts, most of them in the interior of the province. This was the worst season in B.C.'s recorded history, with fire consuming 266,000 hectares of forest. The government reviewed the 2003 fire season and has set in place measures to reduce fire damage and improve emergency response in the years to come. Measures adopted include prescribed burns, tree removal, and reduced fuel in forests.

Although the mountain pine beetle is a natural part of the forest ecosystem, a series of warm winters has contributed to an infestation that affects nearly ten million hectares of forest in central and southern B.C. As a result, forest managers face timber losses, and the disruption of long-term forest

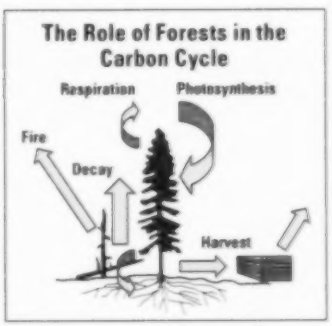
management plans. A winter cold enough to stop the infestation is unlikely to occur in the short term. The government has set in place a Mountain Pine Beetle Management Plan that includes increasing the portion of timber derived from beetle-invested stands, increasing the harvest of beetle-infested wood, slowing the spread of the epidemic by removing small patches of infected trees, developing new uses and new overseas markets for recovered wood, and promoting economic development and diversification in forest communities.

The government is also involved in preliminary research to identify potential changes in forest productivity and species distribution that might be an effect of climate change. Provincial forest researchers are evaluating the suitability of tree varieties for reforestation under different future climate scenarios.

The government also supports the Pacific Field Corn Growers' Association in helping farmers improve irrigation efficiency through local climate monitoring and online access to climate information.

The Kyoto Protocol recognizes the importance of carbon sinks as part of a comprehensive and effective response to climate change.

The international Kyoto Protocol requires developed countries to count both carbon sequestration and greenhouse gas emissions from eligible land use activities since 1990. Emissions or sequestration due to land use change through afforestation, reforestation and deforestation must be counted. Countries are required to declare by 2006 whether or not they wish to include managed forested and agricultural lands in their carbon budgets. In this case, countries must account for changes in the amount of carbon stored in vegetation and soils resulting from the effects of wildfire, pest infestations, harvesting, regeneration and forest growth.



How do forest carbon sinks work?

The amount of carbon in B.C.'s forests is influenced mainly by the age distribution of the trees, which in turn depends on the history of natural and human-induced disturbances. Trees usually require at least two or three decades of growth after disturbance by harvesting, fire or pests before they reach their maximum capacity to absorb new carbon. This capacity slowly declines over time, so that old forests lose about as much carbon from plant respiration and decay as they gain through photosynthesis.

In general, the older the forest the greater the amount of carbon it stores. However, as a forest ages, it also becomes more susceptible to insects and disease, and may be more vulnerable to wildfire. While fire and decomposition of dead organic matter emit some carbon back to the atmosphere, a large part of the carbon ends up in the soil, which is also a significant sink. B.C.'s forests currently hold about 22,000 million tonnes (Mt) of carbon, of which close to 74 per cent is in forest soils and dead organic matter, with the remainder in growing biomass.

B.C.'s forests will likely be a carbon sink over the long term.

Over the long term, the government expects B.C.'s forest to be a net carbon sink as a result of reforestation and changes in management techniques. However, during the first Kyoto commitment period (2008-12), B.C.'s forests will likely be a small carbon source. This estimate is based on the net results of planned forest management, including harvesting and reforestation, the conversion of some old growth to second growth stands, tree growth, and fire suppression. It also takes into account potential future damage from fires and mountain pine beetles, and the provincial responses to such disturbances.

Provincial management can sustain and enhance the forest sink, and reduce greenhouse gas emissions from the forest sector.

The government, with ownership of 94 per cent of B.C.'s forest, is responsible for managing the resource to conserve the full range of forest values, including old growth retention, ecosystem functioning, maintenance of biodiversity, and the long-term economic stability of forest-based communities. The government establishes where and how much forest companies can harvest, and other aspects of forest management. For example, provincial law requires companies to reforest harvested Crown land in a timely manner after logging. Provincial financial support is available for reforestation after wildfire or pest infestations.

British Columbia can enhance or reduce the forest sink through forest management activities.

British Columbia can enhance or reduce its forest sink through forest management activities. Some activities, including timber harvesting and processing, reduce the amount of stored carbon. Others increase or maintain the size of the forest sink. For example, British Columbia currently plants more than 200 million seedlings each year. As these trees grow, they store increasing amounts of carbon. Through fire suppression B.C. maintains stored carbon that would otherwise literally go up in smoke. B.C. typically contributes less than two per cent of total national wildfire-related greenhouse gas emissions, even though the province contains 14.5 per cent of Canada's total forest area.

There are opportunities to improve the storage of carbon in agricultural soils.

More carbon can be sequestered in agricultural soils through relatively minor changes in practices, such as reduced tillage. In fact, "growing carbon" on agricultural lands would create a new crop for B.C. farmers. In the short term, reduced use of nitrogen fertilizer and better livestock feeding systems could control methane and nitrous oxide emissions, but would also probably reduce yields or increase costs. Long-term reductions in greenhouse gas emissions for the agricultural sector require technological improvements to fertilizer management and crop and livestock breeding.

Action 16: The government will continue to manage its forests in a sustainable manner, incorporating carbon management objectives where appropriate.

The government manages public forests for a full range of values and will continue to do so. Provincial forestry practices protect B.C.'s environment and resources for generations to come. The B.C. industry is

obtaining independent certification to assure its customers the industry is similarly committed to sound environmental stewardship. Carbon management is a relatively new forest management objective, and will be considered along with other long-term forest management goals.

Action 17: Government will continue to assert ownership of any forest sink and associated benefits, and call for recognition of the cost of maintaining that sink.

Reforestation, fire suppression, and other sink enhancement activities can increase the amount of carbon stored in forests. This carbon creates "credits" for the current economy that can be traded in markets or used directly to meet greenhouse gas emission reduction commitments.

The federal government contends that forest sinks are a national treasure and that, since the Government of Canada is the party to the Kyoto Protocol, all Canadians own the carbon in provincial forests and any associated credits. The provincial government believes ownership of the credits from forest sinks belongs to the people of B.C., who pay the costs of forest management and resource protection. For example, British Columbians spend an average of $150 million annually to protect forest and range resources from fire and pests. Alberta and Saskatchewan are pursuing legislation to establish their rights to the carbon in provincial forests and soils.

Action 18: The government will develop a policy framework to provide business certainty and support the creation of incremental forestry sinks.

The provincial government will take a leadership role in the national process for enhancing biological sinks wherever feasible. In the long term, the pool of carbon in B.C.'s forests is expected to help offset provincial greenhouse gas emissions. As the landowner, the government owns the rights to incremental carbon sequestered on Crown land. B.C. may use this carbon to participate in the new and evolving global markets for carbon credits. However, before the government and forest companies invest in sink enhancement, a number of challenges must first be addressed:

- **Managing Liability** – Unlike emission reductions from energy projects, carbon stocks resulting from forest management activities can be reversed by unexpected future disturbances. Without a means to assign liability for the impermanence of biological sinks, the government will have to carefully consider its options.
- **Assigning Property Rights** – Private landowners and Crown forest managers must be clear about who owns the benefits from carbon sequestration before they will be motivated to embark on carbon enhancing initiatives. A well-defined ownership framework is required to enable binding contractual agreements that are legally enforceable.
- **Ensuring Access** – In view of the long-term nature of forest-related growth and yield investments, sequestration activities will usually be undertaken in an environment of long-term, secure access to the forest areas. Options for granting long-term security of access range from lease-rental agreements to special use permits to some new form of restricted tenure.

The Ministry of Forests will lead an investigation of these and other outstanding issues, in order to make policy recommendations to the provincial Cabinet. The goal will be to enhance sinks and advance a market for forest carbon credits.

Action 19: The government will continue to improve understanding and protection of the forest carbon sink by supporting modelling and ongoing research, and will continue to protect this sink.

An important area for enhanced modelling is the disturbance caused by the mountain pine beetle. Although the estimate of the current and future size of the provincial forest sink assumes a rate of insect disturbances twice that assumed in earlier national-scale analysis, it may still underestimate the potential impacts of the mountain pine beetle outbreak. Data are presently very limited. As more information on tree mortality and the loss of timber volume becomes available, further modelling to refine the sink estimate will be undertaken.

The government will also continue to participate in research aimed at improving understanding and protection of the provincial forest sink. For example, the government participates in the BIOCAP Canada Foundation, which brings together leading researchers and decision-makers to explore how biological systems, including forests and farmlands, can help address climate change and other environmental issues while improving the economy.

Action 20: The provincial government will enter into discussion with the Government of Canada on forest management mitigation strategies for mountain pine beetle.

The best available information on the mountain pine beetle indicates that the outbreak will significantly reduce B.C.'s carbon storage during the first Kyoto commitment period. Forest management options benefiting industry, federal and provincial government sustainability objectives and carbon targets need to be considered within an agreement between the federal and B.C. governments.

Action 21: The government will improve fire protection for communities in British Columbia.

The government will set in place measures to reduce the risks to communities from fires and improve emergency response to those fires that do occur. There will be more selected tree removal and more prescribed burns to reduce fuel loads. The government has recruited and trained 100 additional firefighters, and added two new air tankers to its fleet. Emergency planning has become mandatory in B.C. The government has developed a Hazard, Risk and Vulnerability Analysis Tool Kit and provided $3 million to the Union of B.C. Municipalities to help local governments prepare for fire and other emergencies.

Action 22: The government will limit the economic and social costs of the mountain pine beetle outbreak.

The mountain pine beetle outbreak will lead to timber losses and the disruption of long-term forest management plans. The government will implement a Mountain Pine Beetle Management Plan that includes harvesting a larger proportion of total timber from beetle-infested stands; slowing the spread of the epidemic by removing small patches of infected trees; developing new uses and new overseas markets for damaged wood; and promoting economic development and diversification in forest communities. One of the goals is to use and market as much of the recovered wood as possible.

Action 23: Under a B.C.-Canada agreement, provincial emissions from agriculture will be reduced by 8 per cent by 2008.

B.C. has entered into a bilateral agreement with the federal government to implement the Agricultural Policy Framework. This agreement includes a commitment to reduce greenhouse gas emissions from agricultural operations by 8 per cent, to a target of 2.4 million tonnes by 2008. The target will be met by implementing a range of management activities under the framework's environmental farm planning component.

Action 24: The government will provide support to the B.C. Agriculture Council to implement best management practices on B.C. farms and ranches.

Within B.C., the Agriculture Council is responsible for leading and directing the environmental farm planning program, with strong support from provincial and federal agencies. The program's goal is to ensure that farmers and ranchers use the best management practices, to minimize environmental risk and maximize environmental benefits. Practices to be encouraged include:

- Conservation and zero tillage, winter cover crops and improved grazing practices to control soil erosion and contribute to protection of agricultural sinks;
- Better irrigation to conserve water, and protection of water quality through measures such as proper nutrient management and off-stream stock watering facilities; and
- More riparian planting, improved manure management and other practices to enhance carbon sinks in soils and reduce agricultural greenhouse gas emissions.

Government Leadership and Outreach

The Government of British Columbia can show leadership in reducing greenhouse gas emissions and in incorporating climate change adaptation into its own planning and operations. Government can also play a key role in increasing awareness and understanding of climate change. The broader public sector, including education and health care providers and Crown corporations, represents B.C.'s single largest organizational entity, occupying 28 per cent of total commercial and institutional floor space in the province. The environmental impacts resulting from public buildings, vehicle fleets, office equipment and supplies, and employee commuting are significant.

Public buildings in B.C. emit around 1.2 million tonnes of greenhouse gases annually. While vehicles and residences are estimated to account for a much larger share of provincial emissions, there are opportunities to cut costs and emissions in public sector operations and, at the same time, demonstrate leadership to other sectors and British Columbians as a whole. In addition, government can integrate climate change into its decision and planning frameworks and support education and outreach to other sectors and the public.

There are opportunities for emission reductions from government operations.

The government's ongoing commitment is to reduce the emissions from government operations by 16 per cent between 2000 and 2005. The annual costs of energy, water use and waste disposal for public sector buildings in B.C. are estimated at well in excess of $200 million. The potential to save on these expenditures and reduce greenhouse gas emissions is significant. The government, excluding Crown corporations, currently operates approximately 5,600 vehicles, which were responsible for just over 38,000 tonnes of greenhouse gas emissions in 2001. While certain ministries have been active in using cleaner vehicles, more can be done. More than 38,600 provincial employees are located in communities around B.C., with the heaviest concentrations in the Capital Region District (CRD) and the Greater Vancouver Regional District (GVRD). Expanding the availability of staff commuting choices other than the single-occupancy vehicle and increased use of alternatives provide multiple benefits including reduced emissions, less traffic congestion and lower commuting costs.

The annual costs of energy, water use and waste disposal for public sector buildings in B.C. are estimated at well in excess of $200 million. The potential to save on these expenditures and reduce greenhouse gas emissions is significant.

The government has started to focus on adaptation.

Government is supporting the development of the information, tools and skills required for adaptation. In 2002 the Ministry of Water, Land and Air Protection produced a report on historic climate trends and their impacts, and sponsored a review of climate and water observation networks. Several provincial agencies engage in research that links impacts with adaptation options. Provincial forest researchers, for example, are evaluating the suitability of tree varieties for reforestation under a different future climate.

There are real benefits to collective action on climate change adaptation. As some of the tools required for adaptation can be expensive and are also useful to a broad group of stakeholders, it is more effective to share the cost of producing them. By working together government, businesses, communities, First Nations and other stakeholders will be better prepared for the climatic future.

An important role for the government at this stage is to coordinate development of the information, tools and skills that governments, businesses and other stakeholders will need in order to adapt. Provincial and territorial governments are working with the federal government to develop a national adaptation framework that will include initiatives to raise awareness, support research, promote knowledge-sharing, and develop tools for impact and vulnerability assessment. The government has a key role to play in establishing and supporting partnerships within B.C. that will help provincial decision-makers adapt to climate change.

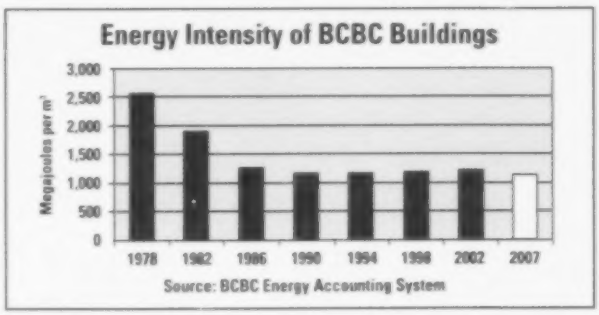
Government is working with NGOs, business and other partners on outreach.

The Ministry of Water, Land and Air Protection supports the B.C. Climate Exchange[37] in partnership with the Government of Canada's One Tonne Challenge program. Part of a national network, the B.C. Climate Exchange coordinates climate change outreach activities in B.C. Its tasks include providing access to resources and increasing the capacity of B.C. organizations to be effective in this area. Wild B.C., a program of the Habitat Conservation Trust Fund, provides training and a multi-media education kit to high school teachers across the government.

The Government of Canada has sponsored a variety of initiatives, such as web sites, museum displays and classroom materials, to raise public awareness and understanding of climate change and promote action in all provinces and territories. It has supported development of the national network for climate change outreach and partnership projects with local governments, businesses and educators. The national One Tonne Challenge, launched in March 2004, asks each Canadian to reduce personal greenhouse gas emissions by 20 per cent – equivalent to a one tonne greenhouse gas reduction per person. Other measures and tools (e.g., EnerGuide home evaluations, greenhouse gas calculators) in the federal climate change plan are meant to help consumers meet the challenge.

Action 25: The B.C. Buildings Corporation (BCBC) is conducting energy audits and retrofits of provincial buildings under a renewed energy management initiative.

In late 2001, BCBC renewed its Energy Management Program to address increased energy use from computerization of government offices and some slippage in energy efficiency during the 1990s. The purpose of the renewed program is to improve building performance, lower operating costs, increase occupant comfort and achieve



other benefits besides reducing energy use and greenhouse gas emissions. BCBC is targeting a 12 per cent reduction in aggregate buildings energy intensity from 2000 to 2007, to be met through energy audits and retrofits. All retrofit projects must be self-financing – that is, must recover their capital costs out of operating cost savings – and are subject to a required rate of return.

Action 26: A new Higher Performance Building Policy will be applied to all new provincially funded buildings.

The policy will set performance expectations for all new construction and major renovations of buildings used to deliver provincial services, including education, health care, ministry and Crown services. One key element of the policy will be an energy performance target. Another key element will be an overall building performance target based on a recognized building rating system (e.g. LEED™ or Green Globe). These systems evaluate building performance in a variety of areas, including water, energy and materials use, indoor air quality, and site development.

This initiative will help build support for the local green buildings industry, and will continue to improve design practices and building performance in local government and commercial buildings across B.C.

Examples of B.C. leadership and outreach actions

1. The University of British Columbia, the University of Victoria, the College of New Caledonia, the Coquitlam School District, the Fraser Valley Health Authority and the Interior Health Authority are among the provincially funded agencies that are building new facilities aimed at LEED™ certification. The Greater Vancouver Regional District has adopted LEED™ as a design guideline, and the City of Vancouver has established LEED™ Gold as the standard for its new municipal facilities.
2. Green Buildings B.C., a BCBC initiative, has supported and monitored four building pilots whose energy savings are 26 to 41 per cent better than the Model National Energy Code for Buildings standard.
3. With the support of a $1 million award from VanCity Credit Union, Better Environmentally Sound Transportation is working with Translink, the GVRD and the cities of Vancouver, Burnaby, and New Westminster to create a corridor for active transportation across the region.
4. BCBC and BC Hydro helped the Capital Regional District to establish a public-private partnership to generate electricity using methane captured from the Hartland Landfill in Saanich.
5. Kamloops' environmental management system is being designed to assist the city in the implementation of its community energy plan.

Action 27: The government will develop guidelines and performance targets for ministries and Crown agencies to acquire cleaner vehicles, fuels and transportation services.

With the exception of a Ministry of Transportation's 1999 mandate for 100 per cent of its vehicle purchases to be alternative fuel vehicles, the direction given to ministries for implementing greenhouse gas reduction measures in transportation has so far been informal. For some uses and locations, traditional vehicles and fuels will continue to be the preferred or only viable choice. In the case of many existing cleaner vehicles the incremental purchase price is only partially offset by savings in fuel costs. For these and budgetary reasons, it is important to clarify expectations and provide explicit guidance with respect to transportation capital goods and services. The government will develop a set of guidelines, and appoint a lead agency to work with ministries and Crown corporations to set realistic agency-specific performance targets (e.g., percentage of alternative fuel vehicles in the vehicle fleet). Each agency will be responsible for developing and implementing actions to achieve its target.

The government will also update guidelines to encourage provincial agencies to purchase office products and services that have less climatic impact.

Action 28: The government will encourage ministries and Crown corporations to incorporate emission reducing policies and guidelines in their service plans.

Service plans lay out the expectations of provincial agencies for delivering their programs over a three-year planning horizon. At present these plans do not address the environmental impacts from government operations. As indicated above, policies and guidelines will soon be in place for buildings, transportation fleets and services, and environmental purchasing. Through their service plans, ministries and Crown agencies can indicate how these guidelines and policies, and other commitments in this Plan are to be implemented, with progress monitored in annual reports.

Action 29: The government will address climate change and extreme weather in planning and operations.

Ministries and agencies can show leadership by identifying and managing current and projected future climate-related risks to their decisions and operations. Provincial agencies currently share information about climate change impacts and adaptation through an interagency team. Additional initiatives include:

- **Service Plans** – The service plans of the Ministry of Water, Land and Air Protection and the Ministry of Agriculture, Fish, and Food recognize climate change as an important risk factor and the need to develop an action plan.
- **Risk Management** – The government manages drought, floods, forest fires, beetle infestations, and other climate-related management challenges. The Ministry of Water, Land and Air Protection

and Air Protection is piloting the use of a decision-making framework that incorporates projected future climate variability and change into risk assessment and management decisions.

Action 30: The government will implement effective monitoring and reporting procedures for climate change and its impacts in cooperation with partners.

British Columbians need reliable, long-term climate observations to detect changes in climate over time, verify the climate models that provide information about future climate, support engineering design, guide resource management and land use decisions, and develop adaptation plans. Current climate and hydrological networks generally collect the right type of information, but do not provide the necessary geographical coverage and station density to address changing climate conditions. The responsibility for existing major climate and related monitoring networks is shared between federal and provincial agencies. The government will work with partners to improve existing monitoring networks, make the data collected widely available, and evaluate and report on climate trends and impacts.

Action 31: The government will help develop climate models and other tools for assessing climate change risks and adaptation options.

Adaptation requires a set of basic tools to identify and measure climate change trends and impacts on economic, physical and biological systems, assess the capacity of communities, sectors and agencies to respond to climate change, and help British Columbians identify cost-effective adaptation options. Some of these tools are generic (e.g., a risk assessment methodology that incorporates climate change), while others apply to specific regions or sectors. The provincial government is participating in a national initiative to develop a flexible generic adaptation toolkit for use across Canada.

The government will also work with local government, industry, research institutes, federal agencies and other jurisdictions to develop specialized tools, including a set of regional climate models (RCMs) applicable to B.C. RCMs are derived from global climate models (GCMs), of which there are about 20 worldwide. Although GCMs incorporate an enormous body of scientific understanding of the global climate system, they are too coarse to be useful for drawing conclusions about regional impacts. RCMs cover a smaller geographical area, provide information about future climate at a finer scale (e.g., B.C.'s various climate zones), and hence are better suited to climate change impact assessment. As RCM development requires significant expertise, time and computing power, it is most efficient for the government and others to share costs in this area.

Action 32: The government will support applied climate change research that meets the needs of decision-makers.

Adaptation to climate change is a new and rapidly emerging field. Because of the socioeconomic implications, it is important that the government keep pace with advancements in the field. To date,

research in B.C. as well as in the rest of Canada has been concentrated on climate modelling and the identification of impacts, with much less attention paid to adaptation. The government will continue to work with research institutions, industry and other B.C. stakeholders to identify provincial research priorities, and support research projects and initiatives that address these priorities and provide guidance on provincial adaptation options.

Action 33: The government will participate in the development of capacity throughout B.C. to respond to extreme weather and climate change.

Much of the expertise in assessing climate-related risks and developing adaptation plans has historically been within the federal and academic research communities. B.C. businesses and others at risk will need access to such expertise, however, in order to assess their own level of risk and adaptation options. Some professional organizations (e.g., the Canadian Council of Professional Engineers) are beginning to develop capacity in adaptation. The government will work with partners to develop B.C. skills in this area, and also to ensure that provincial stakeholders can access the information and tools they require to adapt.

Action 34: The government will prepare and deliver an outreach strategy that supports adaptation and greenhouse gas reduction initiatives in the Plan.

An appropriate role for government is to ensure that British Columbians understand the potential impacts of climate change and have the information they need to make informed choices about greenhouse gas mitigation and about adaptation. To this end, the outreach strategy will encompass

- In partnership with the Government of Canada, maintaining the B.C. Climate Exchange to provide ongoing, coordinated, province-wide public outreach,
- Further development of a focused government website on climate change, its impacts on B.C., and actions that government is taking to reduce greenhouse gases and increase capacity to adapt, and
- Working closely with key partners – including local governments, businesses, NGOs, and educators already involved in outreach – to develop and deliver information about climate change and greenhouse gas mitigation, including a best practices GHG Action Guide for communities.

Action 35: Joint initiatives will be pursued with other jurisdictions where these initiatives support government objectives.

The Plan will continue to evolve through a process of consultation, negotiation and collaboration with the federal government, business and other partners. In the years ahead, the Plan will form the basis for negotiations with the Government of Canada to identify provincial projects and initiatives that are primary candidates for receiving federal resources. At the same time, the Government of British Columbia will collaborate with Alberta, other provinces, and the western states on issues of mutual interest and benefit.

Water Management

The ecological, social and economic benefits of water are enormous. British Columbia's network of lakes, rivers, wetlands and aquifers, fed by rain, snow and glacial melt-water, sustains the beauty and biodiversity that enriches our environment and our lives. British Columbians also enjoy many direct economic benefits from water used for irrigation, drinking, industrial processes, power generation, tourism and fisheries. About 90 per cent of power in the province is produced hydro-electrically, generating annually about $2.2 billion in total revenues for BC Hydro and $750 million for the provincial government in taxes, dividends and water rental fees. Other water use generates over $6 million annually in water rental fees paid to government. Salmon and fresh water fish in B.C. depend on adequate river and stream flows to sustain spawning and rearing. Commercial and sports fishing currently generate about $260 million GDP annually for the B.C. economy. The B.C. government collects about $12 million in annual revenues through licenses and permits for fresh water sports fishing.

The climate strongly affects the abundance of water.

Extreme weather and long term climate change increase uncertainty about B.C.'s water supply and challenge water management policies and practices.

Long term climate patterns as well as short term extreme weather events strongly influence the availability of water. Climate affects the volume and timing of river flows, groundwater levels and lake levels. There is also growing evidence that long term climate change may result in an increase in the frequency and severity of extreme weather events, such as those that produce flooding and drought.

Average annual precipitation increased by 12 per cent during the 20th century across southern Canada. In B.C. the increase in precipitation is significant in all seasons. Where records are adequate in B.C., the rate of increase during this period has been 2 to 4 per cent per decade.

Across Canada, warmer winters have resulted in spring melt occurring earlier in the year, and winter precipitation increasingly occurring as rain rather than snow. This has resulted in changes in the timing of stream flows. During the last 30 to 50 years the beginning of the freshet season in many basins across Canada has advanced by more than a month. This trend is particularly strong in B.C. Continuation of the trend to earlier spring melt, reduced snow accumulation, higher air temperatures and increased evaporation rates will significantly alter water availability and demand. Given the reliance on gradual snow melt to sustain summer flows in many parts of B.C., these trends can be expected to lead to reduced summer water supplies.

The prospect of continuing climate change, growing uncertainty and conflict over water supplies and increasing risks associated with extreme weather events presents an important challenge to water management polices and practices globally and in B.C.

Water management involves many activities and a large number of players.

Water management involves a wide range of activities, all of which are sensitive to drought, floods, and other impacts of climate change. These activities include:

- Providing surface or groundwater for community drinking water systems;
- Regulating water storage for hydro power generation;
- Providing irrigation water storage and supply for agriculture;
- Ensuring adequate water for fish and wildlife;
- Licensing and adjudicating water rights;
- Managing flood hazards;
- Monitoring river flows and lake levels to guide safe design of infrastructure such as bridges, culverts, dams and dikes and to protect shoreline developments and tourism values;
- Assessing snow pack and forecasting flood risks;
- Mitigating the water quality impact of economically important activities such as mining, forestry, oil and gas development; and
- Ensuring industrial and municipal wastes are discharged to water safely.

The responsibility for these activities is shared between all three levels of government and various public and private utilities. These agencies work closely together under the provincial legislative framework of the Water Act which guides the allocation of water rights. Other legislation that sets additional requirements that relate to water includes the Environmental Management Act, the Drinking Water Protection Act, the Dike Maintenance Act, the Land Title Act, the Local Government Act, and the federal fisheries and environmental protection acts.

Current water management policies, planning processes, legislation and engineering practices have evolved based on the assumption that our climate is stable and the longer we monitor weather and water flows the more effectively we can determine average conditions and the probability of future extreme conditions. This enables water managers to know how much water can be allocated for various uses, regulate flows and protect public safety. Given the trends documented over the past century and the expectation of significant climate and weather change in the future, the concept of a stable climate may no longer be a valid basis for water policy and practices in the future.

In response to the growing challenges associated with climate change, the Government of British Columbia is working to improve scientific understanding of the issues, develop practical tools and strengthen water management policies.

Action 36: The government is implementing the Drought Action Plan.

A provincial Task Force on Drought comprised of several ministries has been established to ensure a broad integrated approach is taken to protect water for communities, support economic development and sustain fish and aquatic systems in the short and long term. The task force regularly meets to review information on snow-pack, surface water and groundwater supplies across the province. Timely and targeted responses will be taken as the need arises. A website provides ongoing information on the drought conditions in B.C. and actions being taken to manage the situation. The government has also

allocated $2 million to support drought planning for communities with stressed water supplies. These funds will help communities establish local drought management teams, develop drought and water conservation plans and draft by-laws and contingency plans. A Drought Handbook has been prepared to help water suppliers, technical workshops for local government are being conducted around the province and a public awareness program has been launched. Establishment of an effective drought response capacity will help prepare British Columbia for more frequent or severe droughts that may occur in future as a result of climate change.

Action 37: Information and support is being provided to communities facing flood risks.

The provincial River Forecasting Centre provides information on current and forecast flood and drought conditions to the public and the Provincial Emergency Program (PEP). The government prepares and regularly updates the B.C. Flood Plan which outlines roles and responsibilities in the event of flooding. The Flood Hazard Management Program provides local governments with technical guidance and training in floodplain development, dike management, flood preparedness, and related matters. PEP provides a number of services relating to disaster preparedness, coordination and recovery and disaster financial assistance. PEP also provides funding under the federal Joint Emergency Preparedness Program for flood planning and preparedness activities.

Action 38: The government is supporting climate science and the development of technical tools relating to water resources management.

The government will continue supporting science-based and technical initiatives to better understand impacts and how to adapt to climate change. Ongoing initiatives include:

- Adapting global climate model results to British Columbia to improve understanding of regional impacts and possible changes to water resources;
- Studying the effect of climate change on groundwater in the Okanagan Basin in partnership with Simon Fraser University, the Geological Survey of Canada and other partners;
- Developing storm water management models and guidelines to help urban planners and developers implement storm water drainage systems that minimize runoff over a range of climate scenarios;
- Encouraging the expansion of a network of meteorological stations on farms in irrigated regions to provide farmers with real time access to local weather data and enable them to optimize irrigation practices and water conservation;
- Signing an agreement with Canada to invest in agricultural water supply assessment and infrastructure needs; and
- Supporting the Canadian Council of Ministers of the Environment in developing national water conservation measures.

Action 39: The government will support integrated watershed management to address water resource issues including drought and flooding.

The government is committed to supporting integrated watershed management to ensure secure, sustainable, safe and clean water is available for all users. Various legislative and planning tools are available to government and communities to guide watershed management approaches. Integrated watershed management that involves local land and water users can help resolve conflicts during periods of water shortage, identify long term flood management solutions, and address other water management issues related to long term climate change.

Action 40: The government will work with partners to develop a coastal flood forecasting capability.

Coastal wind storms caused by extreme low pressure weather systems coupled with high tides result in storm surges that can lead to coastal flooding. Climate change may result in an increase in the frequency and severity of extreme low pressure weather systems affecting the B.C. coast. Other ocean and climate cycles, such as El Nino events, also significantly raise sea levels. The gradual increase in sea level observed along much of the B.C. coast during the past century, associated with warmer temperatures, is expected to continue and will add to the flood risk posed by storm surges. The government will work with federal researchers to develop a coastal storm surge forecasting capacity similar to the one already in place in the Maritimes. Such a tool will also be used to investigate future climate and sea level scenarios to determine if current dyke and flood protection standards are adequate. This will complement the provincial river forecasting and interior flood hazard management programs.

Examples of B.C. water management actions

1. The City of Richmond is preparing a comprehensive flood protection and management strategy that will address issues such as climate-induced sea level rise, river flooding potential, minimum flood elevation standards, and options for enhancing the flood protection dyke system.
2. The Greater Vancouver Regional District has considered the potential impacts of climate change in its water supply planning, evaluation of storm water management, and some drainage and sewerage system plans.
3. The Pacific Field Corn Growers' Association is helping farmers improve irrigation efficiency by establishing a network of on-farm meteorological stations to augment the existing federal climate station network and providing real time online access to climate information.
4. The District of Summerland is participating in an integrated study of climate change and water management options in the Okanagan Basin.
5. BC Hydro is taking account of existing climate variability in planning reservoir operations, and looking at potential adaptive reservoir operating strategies.

The Way Forward

Weather, Climate and the Future: B.C.'s Plan (the Plan) lays the groundwork for a comprehensive long-term response to climate change in B.C. It builds on many actions already being implemented by the provincial government, local and regional governments, businesses, consumers and non-government organizations that help react to extreme weather, adapt to climate change and mitigate the growth in provincial greenhouse gas emissions. These efforts, together with the specific government actions presented in this Plan, provide economic, social and other environmental benefits beyond addressing climate change. Partnerships between the provincial government and the federal government, local and regional governments, business and other groups will be essential to taking the Plan forward and developing it further in the coming years.

Implementation of the Plan will require policy development in a number of areas.

Policy will be developed in areas such as:

- Incremental forest sinks;
- Energy efficiency and alternative energy;
- Bio-energy, and hydrogen and fuel cell technology;
- Improved urban development and building practices; and
- Performance targets for provincially funded buildings.

Where regulatory changes are required, the approach will be consistent with the government goals of streamlined regulation and performance-based standards. Areas for likely development include:

- Revisions to the incentives for alternative fuels and hybrid vehicles;
- An energy performance standard for buildings; and
- Updates to the current energy efficiency standards for appliances and equipment.

Attention will be paid to developing performance measures and an effective process for monitoring the emission and other impacts of individual actions in the Plan. Over the longer term, the government will consult with business, communities and consumer groups on additional actions that could be incorporated, building on the base of actions currently identified in the plan, or taking advantage of new opportunities for action as they arise.

Acronyms and Abbreviations

C	Celsius	GVRD	Greater Vancouver Regional District
CO_2	carbon dioxide	ICBC	Insurance Corporation of British Columbia
CRD	Capital Regional District	LED	light emitting diode
FCM	Federation of Canadian Municipalities	LEED™	Leadership in Energy and Environmental Design
GDP	Gross Domestic Product		

Notes

[1] The Canadian Disaster Database includes events resulting in: 10 or more people killed; 100 or more people affected, injured, evacuated or homeless; an appeal for national or international assistance; or significant damage or interruption of normal processes such that the community affected cannot recover on its own; or events of historical significance.

[2] Weather and other natural disasters are classified by the insurance industry as 'great' if the ability of the affected region to help itself is distinctly overtaxed, making interregional or international assistance necessary. This is usually the case when thousands of people are killed, hundreds of thousands are made homeless, or when a country suffers substantial economic losses, depending on the economic circumstances generally prevailing in that country.

[3] The greenhouse gases that are of the most concern to Canada and other nations that have ratified the Kyoto Protocol are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6).

[4] For information about government action on drought see: http://www.lwbc.bc.ca/03water/overview/drought/index.html and http://www.prov.gov.bc.ca/prem/down/slid/drought.pdf.

[5] For information about government action on forest fire see: http://www.prov.bc.ca/prem/down/slid/fire_season.pdf and http://www.prov.gov.bc.ca/prem/down/slid/04june30_fires_update.pdf.

[6] Firestorm 2003 Provincial Review at: http://www.2003firestorm.gov.bc.ca/

[7] Information about government action on mountain pine beetle see: http://www.prov.gov.bc.ca/prem/down/cabi/cab_sub_apr2_04_pinebeetle.pdf and http://www.prov.gov.bc.ca/prem/down/slid/apr2_04_mountain_pine_beetles.pdf and http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/#events.

[8] Indicators of Climate Change for British Columbia, 2002 at: http://wlapwww.gov.bc.ca/air/climate/indicat/index.html.

[9] Energy for Our Future: A Plan for B.C. at: http://www.gov.bc.ca/em/popt/energyplan.htm.

[10] Opening up B.C.: A Transportation Plan for British Columbia at: http://www.gov.bc.ca/bcgov/content/images/@2lFe8_0YQtuW/transportation_plan_web.pdf.

[11] The 2004 Community Charter and information that will help local governments implement its provisions is at: http://www.mcaws.gov.bc.ca/charter/.

[12] For information about the Premier's Technology Council see: http://www.gov.bc.ca.

[13] For The B.C. Heartlands Economic Strategy see: http://www.gov.bc.ca.

[14] More information about implementation of the 2002 Federal-Provincial-Territorial Framework Agreement on Agricultural and Agri-food Policy for the Twenty-First Century is at: http://www.agf.gov.bc.ca/resmgmt/EnviroFarmPlanning/RegionalScanSummary.htm.

[15] Information about the 2002 draft B.C. sustainability principles is at: http://www2.news.gov.bc.ca/nrm_news_releases/2002SRM0002-000062.htm and http://www.prov.gov.bc.ca/prem/down/cabi/may_22_sust_principles_cab_sub.pdf.

[16] The 2002 Climate Change Plan for Canada is at: http://wwwclimatechange.gc.ca/plan_for_canada/plan/index.html.

[17] The 2003 report Canadian Fuel Cell Commercialization Roadmap by the Government of Canada, PricewaterhouseCoopers, and Fuel Cells Canada is at: http://strategis.ic.gc.ca/epic/internet/inmse-epe.nsf/en/ep00031e.html.

[18] Carbon is also stored in biomass products (e.g. wood chips, sawn timber, newsprint, wood furniture) that eventually decay and emit carbon at varying rates.

[19] The British Columbia Climate Exchange is at: http://www.bcclimateexchange.ca/index.php.

Acknowledgements

Development of Weather, Climate and the Future: B.C.'s Plan (the Plan) was led by the Deputy Ministers' Climate Change Committee, chaired by the Ministry of Small Business and Economic Development, and including the Ministry of Energy and Mines, the Ministry of Water, Land and Air Protection, the Ministry of Forests, and the Ministry of Sustainable Resource Management. Other ministries and agencies also provided important input: the Ministry of Transportation, the Ministry of Community, Aboriginal and Women's Services, the Ministry of Finance, the Ministry of Agriculture, Food and Fisheries, the Ministry of Management Services, the British Columbia Buildings Corporation, and BC Hydro.

The Plan has benefited from a series of meetings, consultations and analyses over the years. Since 1997, a multi-stakeholder Greenhouse Gas Forum has advised government through reports, recommendations and workshops on climate change policy issues. In the summer of 2002, three consultation sessions in Vancouver gathered stakeholder views on greenhouse gas reduction measures, domestic emissions trading and forest carbon sinks. That fall, the Minister of Water, Land and Air Protection and the Minister of Energy and Mines appointed an independent panel – the B.C. Climate Change Economic Impacts Panel (the Panel) – to recommend approaches and measures for reducing greenhouse gas emissions in the province. The Panel was comprised of representatives from resource industries, the technology and building sectors, local government, transportation authorities and the academic community. The Panel's report, issued in March 2003, and other pertinent studies are available at http://wlapwww.gov.bc.ca/air/climate/index.html.

The Government of British Columbia has taken part in many provincial/territorial meetings on climate change, and has had ongoing discussions with federal officials on implementation of the Climate Change Plan for Canada. In addition, the provincial government has had numerous climate change-related meetings with B.C. industries, and many contacts with environmental groups and other stakeholders.

Various studies were commissioned to inform Plan development, including analyses of sector competitiveness, macroeconomic impacts, and action costs and opportunities.

All of these contributions have been highly valuable to preparation of the Plan, and the Deputy Ministers' Climate Change Committee would like to extend its thanks to all participants.